

35-mm[®] PHOTO- GRAPHY

SPRING 1

by the Editors of Popular Photography

**SENSORS: HOW LABS TEST
THEM SO YOU WON'T HAVE TO**

**HOW TO ACHIEVE PRINT QUALITY
THAT'S BEST FOR YOU**

**THE SUPER SHUTTER: DO YOU
REALLY NEED 1/2000 SECOND?**

**LIGHTING AND SHOOTING
TIPS FOR BETTER CLOSEUPS**

**ED'S - NEW TREND IN
EXPOSURE AUTOMATION**

**MORE THAN 40 PAGES OF
PICTURES THAT TEACH**

**HOW JILL KREMENTZ
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LITERARY WORLD**





Canon EF with FD 50 mm f:1.4 SSC

total control. In any light.

The Canon EF may very well be the best-conceived and executed fully automatic professional single-lens reflex camera available today. Its shutter is *both* electronic and mechanical. It's electronically timed for stepped speeds from 30 seconds to 1 second, and mechanically timed from 1/2 second up to 1/1,000

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Canon F-1 with FD 50mm f:1.4 SSC

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Added to that is a choice of shutter speeds up to 1/2000th of a second and a spot metering system that concentrates 100% of its measurement on the central 12% of the viewing screen.

What's more the meter is an integral part of the camera body itself. So you can use any of the eight interchangeable viewfinders without losing the meter.

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Canon FTb with FD 50mm f:1.4 SSC

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a camera? By no means.

Since it accepts all FD and FL series lenses, the FTb gives you the same lens interchangeability as the F-1. It gives you the same CAT automatic synchronized flash control. Even the same through-the-lens spot metering system with all metering information shown in the viewfinder. And shutter speeds up to a fast 1/1000 of a second.

The FTb also possesses the advantage of Canon's exclusive QL quick loading film mechanism.

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one kind of camera.



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NOTICE TO THE READER

We consider it a valuable service to our readers to continue, as we have in previous editions of 35-mm Photography, to print the price set by the manufacturer or distributor for each item described as available at press-time. However almost all manufacturers and distributors provide that prices are subject to change without notice.

We would like to call our readers' attention to the fact that during recent years the Federal Trade Commission of the U.S. Government has conducted investigations of the practices of the photographic industry and certain other industries, in fixing and advertising list prices. It is the position of the Federal Trade Commission that it is deceptive to the public, and against the law, for list prices of any product to be specified or advertised in a trade area, if the majority of sales of that product in that trade area are made at less than the list prices.

It is obvious that our publication cannot quote the sales price applicable to each trading area in the United States. Accordingly, prices are listed as furnished to us by the manufacturer or distributor. It may be possible to purchase some items in your trading area at a price that differs from the price that is reported in this edition.

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If you're
breaking into
35mm and
you want a break.

A lot of camera for not much money.

You get an accurate behind-the-lens meter; a match-needle, so you're always in control of your own photographic destiny.

Because the camera accepts standard screw-in lenses, you have literally hundreds to choose from, including the superb Rikenon system: everything from fisheye to monster telephoto.

You get shutter speeds to a thousandth, so you can stop the fastest action, a self-timer, and a dozen little touches that make the difference between a great piece of equipment that doesn't cost much, and a camera that just doesn't cost much.

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This is all the 35mm SLR you ever hoped for, at a better price than you ever imagined.

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You can choose automatic EE lenses from our Rikenon system, ultra-wide to ultra-long, and tailor your camera to your kind of photography. Or pick from the practically endless list of screw-mount lenses the Auto TLS EE accepts: they won't be automatic, but they'll be better than they are on any ordinary camera.

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Ricoh vs. Ricoh.



ELEVEN WAYS TO MAKE



And earn extra cash—in spare hours, evenings or weekends—doing something you love. Read how easy it is to learn how!

You probably have the natural talent; the trick is to learn the know-how that can turn raw talent into cash. That's when the unique School of Modern Photography gets into the picture. Thousands of SMP students and graduates, who were photography buffs just like you, are earning extra money week-ends and evenings because of what they learned from SMP. You can take the course too . . . at home, in your spare time, at your own speed. You'll find it fun—and low in cost.

EARN FROM YOUR THIRD ASSIGNMENT

From very early in the lessons, most SMP students who want additional income are making money with their cameras. Why not you? We'll show you where and how to find assignments and how to deliver professional quality photography. We'll even pro-

vide you with a pricing guide that shows how much to charge for your product. And, we also give you a complete manual that lists over 900 buyers of free-lance photography. Many SMP students pay for their course with earnings long before diploma time.

HERE ARE SOME OF THE MANY KINDS OF PHOTOGRAPHY SPECIALTIES THAT COULD ADD TO YOUR INCOME DURING TRAINING.



WEDDINGS

This year there will be 1,300,000 weddings. Average expenditure for photography is \$300. with much of it spent for candid albums. To get your share, you need fast film, a good candid camera, confidence and professional step-by-step training you'll receive with the SMP course.



CHILDREN

Some of the best child photography is shot in the customer's home. You don't need a studio. It's fascinating. Do a good professional job, and the referrals just seem to come. The SMP course teaches you how to handle a sitting—and even how much to charge.



NEWS

Your local paper needs photographs of meetings, local officials, fires, sports, and many other news events. You'll be able to shoot them all after your SMP training. Not only will you have the ability, but you'll have the confidence and credentials to join the staff.



ADVERTISING

Local printers look for skilled photographers who can turn in professional quality photos. Businessmen have folders, brochures, catalogue sheets and special sales that require illustrations of products before the printers can go ahead with the job. Commer-

cial rates average \$6.55 to \$10.90 per shot, lately. It's easy to make \$50. an assignment when you have the confidence and techniques that the SMP course can give you.



REAL ESTATE

Almost always when a house or building is listed, a photo is necessary to show prospects. Required are best advantage view, good composition and a crystal clear image. Most realtors know good work when they see it and are willing to pay for it. Archi-

tects and builders use presentation books of their past buildings to sell prospects. Architectural color photographs—size 8 x 10—average from \$16.25 to \$54.50 per shot on today's market. You'll learn what you need to know—quickly—when you take the SMP course.



TRAVEL

Nothing provides new friends and interesting opportunities like travel photography. First, developing, cropping and editing a friend's collection of photos, or making slides can be an interesting and profitable skill that you learn from SMP. And the photog-

rapher who can shoot local points of interest and compose pictures that tell a story, has a wide field of buyers for his work. Over 100 travel photo buyers are listed and described for students as part of the SMP course.



DARKROOM

Most people would like to have a reliable local source for developing the pictures they take. Extra prints for relatives and friends can be ordered on the spot. Enlargements, cropping, tinting and effects are easy to suggest. As part of the SMP course,

darkroom skills are taught. Negatives, pre-exposed films, and example prints come to you as part of the lessons. You'll find that darkroom work makes friends and gains photo assignments when the word gets around that you can perform quickly, easily, without high cost.

The School of Modern Photography,

Dept. 4-234-035, 1500 Cardinal Drive, Little Falls, N.J. 07324

MONEY WITH YOUR CAMERA



COMMERCIAL

Commercial photography uses are many and varied; just about every manufacturing plant needs photo-

tography. Rather than lengthy instruction manuals, industry uses step-by-step photos for assembly instructions, operating manuals, and progress reports. These photos convey information faster than the written word. With your SMP training and credentials, a visit to plants in your area can turn up some interesting assignments.



PUBLICITY

You may think of publicity as a need of famous people. But you'll find that all levels of individuals who work

with the public need publicity. Anyone who speaks even occasionally is asked to send a photo. Anyone who makes public statements such as hospital administrators, school board members, government department heads, and union local officers have to use two or three dozen shots a year, in addition to special shots. You'll find clubs, hotels and entertainment facilities in your area have need for publicity photos. You'll learn why and how these shots are used as part of your SMP training.



STUDENT PHOTOGRAPHY

One of the largest recorded markets in photography is

students. 14.4 million student photographs were shot in the last U.S. Census year. A surprising amount is studio work sent to relatives and friends for family occasions. When a student is far from home, there are quite a few requests for "what he looks like lately". Student photography is a type of Portrait photography, and you'll learn what you need to know in the SMP course to attract some business from college and boarding schools in your area.



FREE LANCE

Over 900 buyers of Free Lance photography have told SMP what kind of photos they are looking for and

how much they pay. Every student of SMP receives a directory of these buyers, as well as information on every facet of the business that one needs to know. Of course, there are literally tens of thousands of other buyers. Local newspapers and advertising agencies buy free-lance. Many photographers think free lance is the most exciting and interesting of all the specialties. You'll learn all about Free Lance in the SMP course.

SPRING 1975

OUR STUDENTS REPORT HOW SMP TRAINING ENABLES THEM TO EARN EXTRA MONEY

"I enrolled in your photography course to improve as a hobby. I do photography on a part-time basis to pay for my equipment. While taking the course, I earned \$7,000 and now that I have completed the course, I earn approximately \$5,000 yearly in my spare time with photography."

Robert Martin,
Lorrainville, Quebec, Canada

"I'd like to thank SMP for the great course which has helped me to make so much money. Just today, I made \$25 for pictures I had taken of a baby. Since I'm barely 15 years old, it's not easy to find a job, but photography seems to pay off very well."

Laurie Rice
Houston, Texas

"SMP has given me the opportunity to jump from the snapshot photographer to professional through its complete course material and straightforward instructors. In my first wedding I sold 72 prints instead of the 16 originally ordered. I have taken in over \$500 in the past three months from home portraiture and this is during my spare time. Due to my limited spare time, I have to turn down jobs and I have never solicited work."

Michael F. Reitz,
Lafayette, Louisiana



"I have enjoyed your photography course. I started with \$200 worth of equipment and now have \$3,000 worth—all purchased with earnings from photography. Last year I grossed over \$6,000 in my spare time with my camera! So far this year I am running ahead of last year."

Eugene Haynes,
Alamogordo, New Mexico



"Since taking the SMP course, I have made between \$45.00 to \$60.00 a week in my spare time. I am building my own darkroom and this extra money helps pay for equipment and advertising. The school has a lot to offer anyone who is thinking seriously about photography."

O. T. Williams, Freeport, Illinois



"I took the course as a spare time money maker and a full time occupation when I retire from my present employment. The course is a very comprehensive one. I earned \$300 while taking the course which helped pay for equipment. I highly recommend your school to anyone interested in photography."

T. V. Bragwell,
Fair Oak's, California

GET IN ON THE GREAT OPPORTUNITIES

Never before have there been so many opportunities in the expanding field of photography. And the SMP "Learn By Doing" method is uniquely designed to prepare you for success in this richly rewarding field.

HERE'S HOW EASY IT IS

With the experience of more than 35 years and over 50,000 students, the School of Modern Photography has perfected an ingeniously successful home-study teaching method that really works. It's easy. It's enjoyable. You learn in your spare time. You go at your own speed. And you don't have to travel to a single classroom — it's entirely by mail.

YOU LEARN BY DOING

The reason the SMP course is such successful training is that you learn by *doing*. After each lesson, you have a photo assignment that is designed to show how well you understood the subject. Friendly and sympathetic

SMP master photographer/licensed instructors teach you on the basis of your own photography. You may get compliments, or get your photos back, overlaid to point out weaknesses, along with an explanation of what is wrong, and a point-by-point explanation of how to overcome your problems. You'll find your instructors will take the time to help you individually to be sure that you understand. You'll see yourself progress toward professionalism with each lesson. Early in your training you'll probably be seeking some assignments for pay. *You'll be making money with your camera.*

GET STARTED NOW

Without obligation, get all the facts about how to get going. If your goal is to make money with your camera, or just to learn how to shoot better pictures for your own self-reward, mail the card or coupon now. It will get you a FREE, fully informative, 36 page color Catalog, and all the facts about the unique School of Modern Photography home study course. No salesman will call, we promise.

COMPLETE AND MAIL THIS COUPON NOW

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Please send me full information regarding SMP's famous Home Study Course. And send me your big free super-illustrated book that tells about SMP's methods and teaching systems, and gives me the picture of the opportunities I can find in photography. No salesman will call.

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All of us want to have confidence in our ability to make what we call sharp pictures. Even when we deliberately smear the image by using slow shutter speeds, moving the camera, shooting through a soft-focus filter, or some other technique, we want some baseline against which our final images are compared. Ideally, we'd like our images to reproduce the object on demand faithfully.

For this reason, the topic of lens testing has been one of the perennial favorites in photo magazines, yet it's hard to imagine a subject that's more misunderstood and abused. In what follows, we'll explore several aspects of lens testing, posing some fundamental questions first and then suggesting some practical answers. We might begin by describing the way lens makers approach the subject of lens testing.

A lens manufacturer begins with a statement of performance characteristics for a lens that does not yet exist. One of the properties of this lens is its cost, and while this plays a paramount role in determining all that follows, it will be our position that this question can be dealt with in a minimum of space.

Briefly, high cost shows up primarily in the form of: the number of parts (both optical and mechanical) that are scrapped during manufacture and/or assembly because they fall short of some strict criteria, the cost of materials, complexity of design, and thoroughness of inspection. Getting back to our lens maker and the way he approaches lens testing, once the performance characteristics are established, the design goals can be determined.

To justify, prove, or assure the success of a design, a series of tests will be conducted with a prototype. This handmade sample is tested to see whether the design goals have been satisfied. Tests are selected on the basis of the performance goals, specific application of the lens, and either with the lens in isolation or as an integral part of a system.

As the actual work of producing the parts (both optical and mechanical) for the lens takes place, a number of measurements and tests are made. These tests serve the purpose of measuring the accuracy with which the parts are fabricated and assembled. The stress is on measurement, thus quantitative rather than qualitative properties are foremost.

Things like the thickness and curvature of individual lens elements are tested continually. Even the condition of the black paint used on the element edges and inside the lens barrel must be monitored frequently. A seemingly endless chain of interrelated processes and materials must be scrutinized on a continuous basis if all is to go well.

Specialists within the factory check machinery performance, abrasive uniformity and purity, and hundreds of other details that end up as small but mighty factors in the fidelity of the image. To have confidence that everything is going properly, the manufacturer performs all the ongoing tests mentioned, then a final test or series of tests to the lens itself.

Minimum performance levels must be established first. Then each lens, or a representative sample from a given number of lenses is tested on a "go/no-go" basis. Knowing the design goals, the performance characteristics desired, and the adjustment possibilities, the manufacturer may be able to correct those lenses that fall short of his minimum quality standards. Such things as cosmetic properties are among those examined during this form of testing.

The exact nature of a manufacturer's lens test will depend on his idea of what test or tests serve best to tell him what he wants to know. This leaves a lot of room for individual choice, with the corresponding variation in complexity, data gathered, time involved, and agreement between the manufacturer and



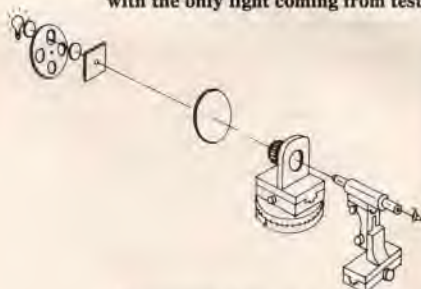
HOW THE EXPERTS TEST LENSES—

And Why You Shouldn't Have To

BY NORMAN GOLDBERG



One of optical testing's most venerable methods, the star test, is shown being conducted in our optical test lab. This test, like many others we use, is normally carried out in a darkened room, with the only light coming from test target at far end of bench.



Components for a star test consist of (l. to r.) a high-intensity lamp, condenser, filter wheel, diffuser, and pinhole (the artificial star). Next in line is the collimator lens, which has the illuminated pinhole at its focal point, thus presenting the point of light to the test lens as though it were infinitely distant. The test lens is mounted on a nodal slide, permitting examination of the image both on- and off-axis. The observer views the image through a microscope of about 200 power. Star test on lens with coma and astigmatism produces off-axis image like this (r.). It would look like bull's-eye target if the lens were perfect.

an independent testing facility.

No matter how widely different lens testing methods may be, they can be divided into two basic types: testing the lens in isolation, and testing the lens as part of the total system. Isolation tests ignore the influence on the final image that camera body and/or film characteristics will introduce; they are intended to assess the image-forming properties of the lens alone.

The lens is tested under ideal conditions of support; stable mounting means are used that afford precise orientation, aiming, and adjustment to various targets and/or detectors. Depending on the properties being tested, the lens is presented to specific targets whose properties are known, measurable, and frequently monitored so that results of the test can be calibrated easily. The equipment used must be of high enough caliber so that its influence on the results will be either negligible or easily compensated for.

Depending on the test, this equipment might be as uncomplicated as the reasonably straight edge of a razor blade, or it could be as intricate as an elaborate electro-optical image scanner with a computer interface. In either extreme, there should be means for checking the integrity of the test equipment against some standard and making whatever corrections may be required.

Because of the many types of isolation tests, selecting the ones for the lens in question is best done by determining the nature of the object the lens will be presented to in actual use, and the nature of the image expected (desired). The first consideration, the likely nature of the actual object(s) the lens will be pointed at, determines the type of target used in the test. Its size, shape, location, and radiant energy properties are chosen to simulate those of the eventual target.

The general-purpose 35-mm camera lens presents what is probably the most difficult set of problems to the tester of all lenses. Because of its purpose, this lens will be presented to the broadest range of targets imaginable. For its detectors, it will be using any one of the many photographic emulsions available, from panchromatic black-and-white, color negative, and color positive, to infrared (with filter in place), as well as the human eye (for focusing).

Some of the more modest manufacturers limit their isolation lens testing to the visual observation of the enlarged image of a resolution target projected by the lens under test. Here, a special projector with a carefully made resolution target on a glass plate uses the test lens as a projection lens. The validity of such a test is open to argument, but it does have the virtue of being fast, inexpensive, repeatable, universally known, and reasonably discriminating—presuming good operator skill and experience.

Instead of a resolution target, some users prefer one with various geometric patterns. Also, it has been found that clear lines against a black background will give results different from black lines against a clear background, so there is a fair amount of disagreement among those who test by projection on the exact style of target used.

More completely equipped manufacturers engage in more elaborate forms of testing, with the result that more of the properties of their lenses are examined, understood, and improved upon as time goes on. From the description of the tests that follow, we get some idea of the amount of time, effort, and money spent on appraising lenses by those who make them.

The star test is one of the most venerable test methods used by lens makers. It consists of aiming the lens at a distant star and using a microscope to examine the (greatly magni-



Picture of melancholy girl gazing out of rain-struck window evokes completely different response than picture of burly craftsman bent over his work. Should both pictures be judged against the same standards for sharpness? Would most viewers be able to?



HOW TO TEST LENSES *continued*

fied) image. The star itself may be real or artificial. Means are provided to mount the lens so that its alignment to the star may be accurately adjusted. The image is examined for many properties, but above all, the departure from the ideal is so readily apparent that even the beginner can learn to recognize some of the classic aberrations in a short time.

Although the test can be made quantitative and reasonably objective, it remains fundamentally a subjective test and has been criticized often as "giving too much information." With the proper test equipment, meaningful and repeatable test results can be recorded. Even with very modest equipment, an experienced observer can intelligently conclude a great deal about the likely performance of the lens in practice.

The various forms of contrast testing include the point and/or line spread function, the edge gradient, and the modulation transfer function. Contrast testing has won widespread acceptance in the optical community and has, over the past 30 years during which time it has evolved, become one of the most powerful methods used to specify and evaluate image quality. It brings with it some elegant advantages and some frustrating drawbacks.

For the advantages, it offers the possibility of accurately predicting the exact nature of the image resulting from all those system components that lend themselves to this test, and this includes the medium between the target and lens, the lens itself, and the detector (the film).

By multiplying the test results from all the different components, the final image contrast can be derived. The major disadvantages are the relatively high cost of the test equipment, the need for superb systems to conduct the test, and

perhaps worst of all, the seemingly endless data resulting from a complete test series.

What contrast testing involves, in the briefest terms, is to form an image of an object of known contrast, then compare the contrast of the image with that of the object. The object may consist of a target composed of a periodic grating whose element spacing varies smoothly from coarse to fine, and whose contrast between its elements varies smoothly from bright to dark.

Something that looks like this is a long picket fence when seen at an angle. The slats and spaces nearest to us resemble the coarse or widely spaced target detail. As the picket fence recedes in the distance, the apparent width of the slats and spaces becomes less and less.

Of course, the picket fence does not satisfy our requirement that the contrast between the target elements (the slats and spaces here) vary smoothly. In fact, the contrast varies abruptly in what's known as a square wave luminance distribution. Ideally, the distribution would be sinusoidal, or smoothly varying from minimum to maximum luminance.

By measuring (with a light meter) the luminance distribution of the target, its modulation can be calculated thus: Call the reading from the darkest portion Black (B), and the reading from the lightest portion White (W), then use the simple formula $W-B/W+B$ to express the target's modulation.

When we form an image of this target with our test lens, we can measure the modulation of the image in the same manner. By dividing the image modulation by the target modulation, we get something less than unity, i.e., a fraction. This is so because even with a perfect lens, the wave nature of light would prevent the formation of images with perfect fidelity.

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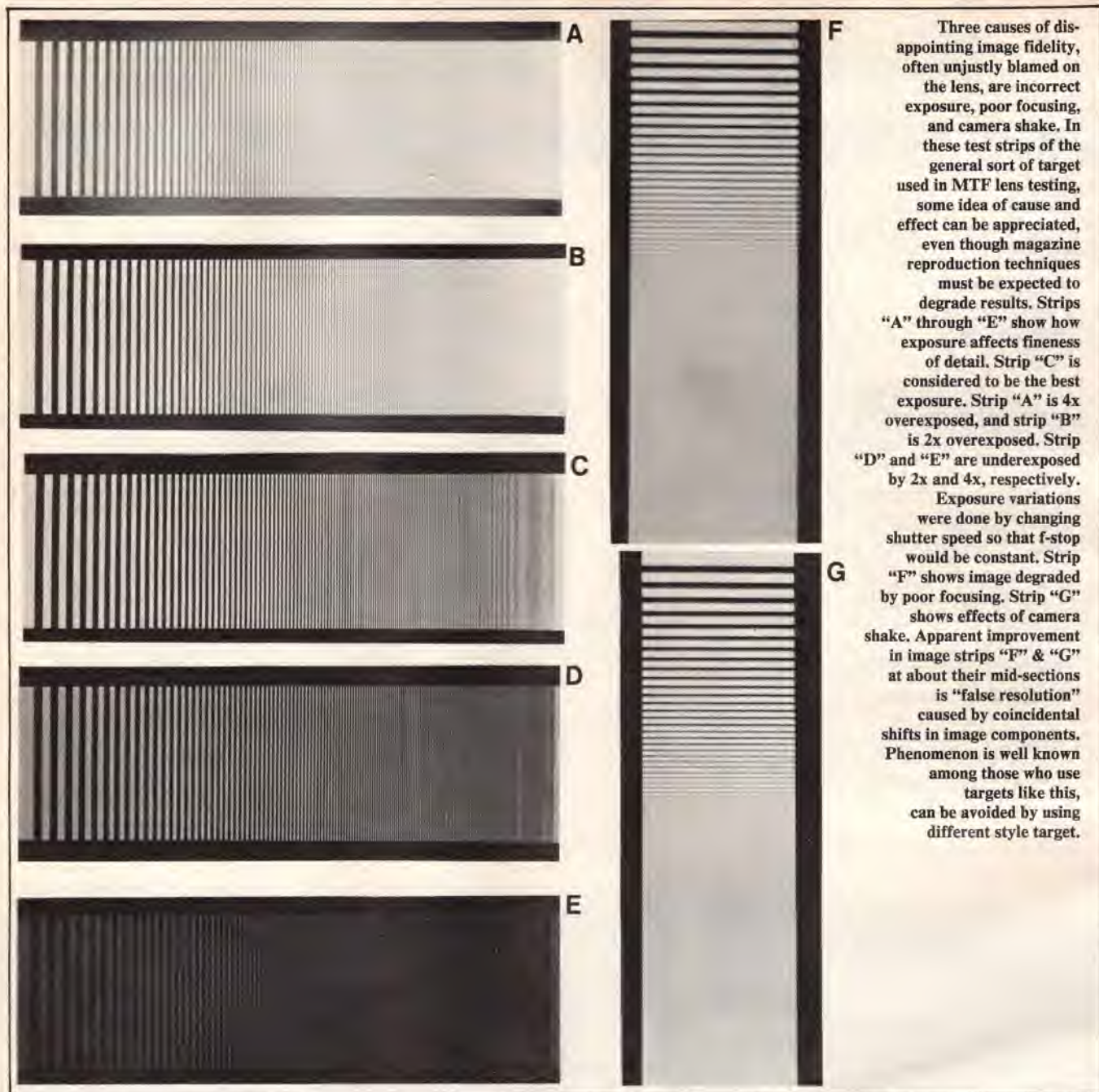
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Three causes of disappointing image fidelity, often unjustly blamed on the lens, are incorrect exposure, poor focusing, and camera shake. In these test strips of the general sort of target used in MTF lens testing, some idea of cause and effect can be appreciated, even though magazine reproduction techniques must be expected to degrade results. Strips "A" through "E" show how exposure affects fineness of detail. Strip "C" is considered to be the best exposure. Strip "A" is 4x overexposed, and strip "B" is 2x overexposed. Strip "D" and "E" are underexposed by 2x and 4x, respectively.

Exposure variations were done by changing shutter speed so that *f*-stop would be constant. Strip "F" shows image degraded by poor focusing. Strip "G" shows effects of camera shake. Apparent improvement in image strips "F" & "G" at about their mid-sections is "false resolution" caused by coincidental shifts in image components. Phenomenon is well known among those who use targets like this, can be avoided by using different style target.

HOW TO TEST LENSES *continued*

We find that the ratio or fraction that expresses the image by dividing its modulation by that of the target gets smaller as the target's fineness increases. By plotting the target-to-image modulation ratio against target fineness, we get a curve known as the Modulation Transfer Function (MTF).

Many workers in this field have concentrated on one or more discrete target finenesses rather than a broad range, because they feel this gives them sufficient information about the performance of the lens under actual use. The particular target fineness, or spatial frequency as it's called, is chosen on the basis of some practical limit such as our visual acuity.

This is widely acknowledged to have a limit such that detail finer than about seven line-pairs per millimeter cannot be discerned at normal reading distance under average conditions (whatever they are). Whether we all agree on this figure or not, a figure rather close to it will be found to express the limit of our ability to distinguish fine detail.

By taking this figure and working backwards from the final

image (the print or the projected slide) to the primary image (the negative, or the slide itself), we can select a spatial frequency to single out. In the case of an 8x10-inch print, we have to enlarge our 35-mm negative about eight times to produce it, and if we want to exploit fully our visual acuity by presenting about seven line-pairs per millimeter on the enlargement, we'll have to have about eight times that spatial frequency on our negative.

If all the transistors in my calculator are chugging along properly, 8x7 is still 56, and that's how many line-pairs per millimeter we need on our negative to get seven line-pairs per millimeter on an eight-times enlargement. If we choose 56 line-pairs per millimeter as our "merit frequency," our MTF test is greatly streamlined, because we'll investigate only that single target fineness, not a broad range. The contrast test used by POPULAR PHOTOGRAPHY is based on a merit frequency of 50 LP/mm.

Some workers regard 15 line-pairs per millimeter as their merit frequency, claiming that even though this may seem too

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coarse, they can predict their lens's performance quite accurately by testing at that frequency. Others select three values, such as ten, twenty, and forty line-pairs per millimeter, and measure contrast at these points. Regardless of the actual merit frequency, if any, some form of contrast test is now widely adopted by the better lens makers as being the best, most advanced method of predicting the image quality of their lenses.

But by itself, MTF testing falls short of satisfying the need for knowing all there is to know about the way a lens will perform in a wide variety of situations. Some lenses used in routine picture-making may perform quite well in an MTF test, yet exhibit dismal qualities when the subject is backlighted because the lens has a high flare level. Consequently, a flare test is considered a must by many top-grade lens manufacturers.

Flare testing involves flooding the front of the lens with light from all angles while a totally black target area is presented to the lens. Using a detector to measure the amount of light intruding into the ideally dark image area gives the flare level for the lens.

To predict how the lens will perform when an intense source of light is included in the scene being imaged, a similar, though in some ways opposite form of the flare test is employed. Typically, a multi-element lens will produce ghost images of an intense light source when that source is within or near the borders of the scene being imaged. The number and intensity of the ghost images may be determined by performing a test in which a bright light is directed at the lens in an otherwise darkened room.

The cause of ghost images is internal reflections of the light from one or more lens element surfaces and they can be made to occur from most compound lenses under certain conditions. These conditions are synthesized with the bright light by moving it across the lens's field of view and examining the resulting image. The primary image of the light itself is masked off so that the dimmer ghost images may be seen.

Transmittance tests measure the energy-transmitting efficiency of the lens. The test may be carried out strictly for white light, or it may be designed to measure the spectral transmittance of the lens.



Testing lens in lab for transmittance involves measuring collimated beam of light as it enters lens, then as it emerges. Photocell used is shown in position for second measurement. Dividing second measurement by first gives percentage of transmittance.



Evaluating images of lens tests should be done carefully to avoid introducing other variables. Rudolf Seck, Leitz test specialist, examines test negatives with high-grade microscope.

In practice, a collimated (parallel) bundle of light is directed toward the front of the lens. The bundle's diameter is slightly less than the largest diameter the lens can pass when it's wide open. The illumination of the bundle is measured before it enters the lens, then this value is divided into the one obtained by measuring the illumination of the bundle emerging from the lens. The result is taken as the transmittance of the lens.

Focal-length measurements can be accomplished in a variety of ways. The main purpose is to determine the location of the image point for a corresponding object point located at infinity. All lenses have two focal lengths—one front and one rear (or simply, first and second)—and these are measured from the first and second nodal points of the lens. Determining the location of the nodal points is another measurement that is frequently required.

One rather simple method employs the property of lenses that involves their forming life-size images of an object. In this special case of image formation, the object and image are both located two focal lengths away from the front and rear nodal points, respectively. The procedure involves finding the location of the image of an infinitely distant target first. This image location is noted and called "F."

Next, a carefully graduated scale with fine-line markings is placed in front of the lens and moved until its image is exactly the same size as the object. The location of this image, measured along the optical axis just as our first (infinity target image) measurement was made, is called 2F. The distance between F and 2F is the focal length of the lens. More pre-

cisely, it's the second focal length of the lens, and the one most of us are interested in.

If we want the location of the second nodal point, all we do is measure from the point we found to be F back toward the lens. For locating the first focal length and first nodal point of the lens, simply reverse it and carry out the same procedures.

For measuring the maximum aperture of the lens, locate a tiny source of light exactly at the point we called F and measure the diameter of the bundle of light emerging from the front of the lens. By dividing the focal length by the diameter of this bundle, the maximum aperture or f-stop is obtained.

Resolving power, or resolution testing, is no longer regarded as the most meaningful way of evaluating an image. Most authorities favor some form of contrast testing over resolution testing. Nevertheless, resolution testing has the virtue of being one of the tests that the average user can relate to, and what may be even more important, he can conduct the test himself with a minimum of equipment and/or training. The test may be performed with the lens in isolation or as part of the system.

Using a microscope to examine the aerial image of a resolution test target formed by the lens is one way to conduct the test with the lens in isolation. Using sensitized glass plates in a special holder and photographically recording the resolution pattern in the image plane is another way. But by far, the most common procedure is to put the lens on a camera, align it to the resolution test target, and make a series of exposures. Then the film is processed and examined with the aid of a medium-power microscope.

The major drawback to this is that the entire photographic system, not just the lens, is being tested. This cannot be stressed too much, as many a good lens has been condemned unjustly when its evaluation was based strictly on its performance as part of the system used to photograph a resolution test target. This leads to the question of how to conduct system tests so that the contribution of the various components or processes may be discerned.

Fundamentally, the tests involving the entire system should duplicate the conditions expected during actual "field" use of the optical system. By careful selection of targets and their surround, specific properties of the system may be assessed.

An example of this is the system test for ghost images. Placing an intense light source in an otherwise darkened room so that the concentrated beam from the light is directed at the front of the lens, a series of exposures are made with the light beam at various angles to the lens axis. The ghost images, if any, will show up on the resulting (processed) film.

Testing the system for veiling glare is carried out in a manner that might be thought of as the exact opposite of the ghost test, in that the camera is aimed at an infinitely broad, evenly illuminated area containing a totally black spot. A series of exposures is made, varying the angle of the black spot (relative to the lens axis), and varying the lens aperture. Although a sensitometer should be used to evaluate the resulting photograph, this test does lend itself to having the results compared with others using side-by-side comparison with the unaided eye.

Ideally, the image of the black spot should have no light in it whatsoever. In practice, this is hardly ever realized, and the amount of light within the image of the black spot becomes a measure of the veiling glare of the system. Obviously, the sensitivity characteristics of the film being used should be known and taken into account. Film choice should be based on both the nature of the test being conducted, and the ultimate



Ghost images in lab test (top) and field use (bottom) can be made to occur with most any lens, and although multi-layer coating helps subdue ghosts in many cases, under certain conditions they too will form strong ghosts. While use of lens shade is recommended at all times, condition where intense light source is *within* scene has immunity to shade, as far as ghost images are concerned. Lab test (top) involved shining bright light into lens at slight angle in darkened room. Felt disk was used to mask image of light formed on groundglass screen so that ghosts would be more apparent. Lens was multi-layer coated, tested wide open. Second camera made picture of groundglass screen to record ghosts.

mate use of the optical system.

Some camera bodies are quite efficiently baffled against flare, while others offer no more protection than a token coat of relatively matte black paint on their insides. All else being equal, the former cameras will produce "snappier" looking images than the latter ones. Because of this, we have to hesitate a bit before we condemn a lens. It may well be the camera body that influences our test results more than the lens. Flare testing does offer one of the best examples of this, but it's just one example.

So many variables become intertwined in a system test that they may obscure one another. To avoid unnecessary confusion in interpreting the results, care must be exercised in the step-by-step methods of conducting the test.

The mounting and positioning of the camera on a stable platform is of great importance. Correct focusing on the target, with the aid of a focusing magnifier of some sort is recommended. Clearly legible data, appearing in each test photograph, assures freedom from confusion when they are examined.

Correct exposures, based on reliable exposure metering and having the exposure-regulating factors of both the shutter speeds and f-stops pre-calibrated is quite important. Lacking



Grabshot of street violinist was made with 1935 vintage lens on old Leica. High flare level of lens (3%) helped picture by spilling light into shadow areas.

HOW TO TEST LENSES *continued*

this, the test shots should have their exposures bracketed by a full f-stop to either side of normal.

Just how important the question of optimum exposure is to image quality can best be judged by conducting the following test. With the camera mounted on a sturdy tripod, shoot some subject containing fine, medium, and coarse detail. A page from the movie section of the local newspaper will do.

Vary the exposure by changing shutter speeds only, so that the lens will be judged at the same f-stop regardless of the exposure. By going about three shutter speed settings above and below the one called for by the exposure meter for the test shot, a good set of examples may be produced.

Whether the images are on color or black-and-white, positive or negative, we can see that in terms of optimum image detail, there is an optimum exposure. The best way to determine this is to select that portion of the image containing the finest detail. This is where even very small differences in exposure levels show up in the form of reducing contrast between adjacent image details.

It frequently happens that image detail is recorded, but at so low a contrast level as to be useless. This happens to be one of the areas in which MTF techniques prove particularly useful because not only the lens, but the film too can be described by its own MTF curves.

It can be shown that, for example, a given film will render 50 line-pairs per millimeter at a contrast of, say, 20 percent. Now if the lens itself renders this same spatial frequency (50 line-pairs per millimeter) at, say, 50 percent, the net result will be a rendering on film of only 10 percent.

It well may be that by the time a print is made from this negative, the measly 10 percent contrast will be way too low to be rendered at anything like a discernible level once it gets further attenuated by the enlarger lens and enlarging paper, both of which have (you guessed it) their own MTF characteristics.

Since any question involving MTF measurement must be regarded as purely academic to most of us, the thing that counts most is how that ancient and honorable final image detector, the human eye, appraises the image. For this reason, optical testing by the user should really be called image evaluation.

About 60 years ago, the man who was to become the first director general (president) of Zeiss Ikon, Professor Emanuel Goldberg (no relation to the author) devised a lens testing apparatus consisting of a group of targets spread out in a line so that the entire field of the lens is covered. Each target contains three illuminated pinholes, one above the other, and in front of the pinholes is a neutral density wedge that gives them an intensity difference from 1 (the darkest) to 100 (the lightest).

The lens being tested forms an image of the target array on a tilted glass plate coated with a photographic emulsion. A series of exposures are made on the same glass plate, first at its lowest position, then raised slightly, and so on, until it's at its highest position. The resulting plate, now covered with images, shows the lens performance as a function of three variables: field angle, focus position, and exposure density.

The last of these variables, exposure density, shows that Professor Goldberg knew how vital this was in judging a lens's performance by examining the images it formed. Goldberg's lens testing device was quite a breakthrough, and even today it resides in a place of honor at the Institute of Optics in Paris. The work that has gone on since this early investigation continues to point in the general direction of relating the final image to the final detector, the human eye.

A fair amount of work has been done to catalog the various characteristics of the eye, especially on behalf of the military, whose need to know about the limits of human vision goes back to the dawn of military science itself. One advantage of having the military do so much research on the question of human vision is that most of their findings are based on testing not dozens, but hundreds of "volunteers" for any given test.

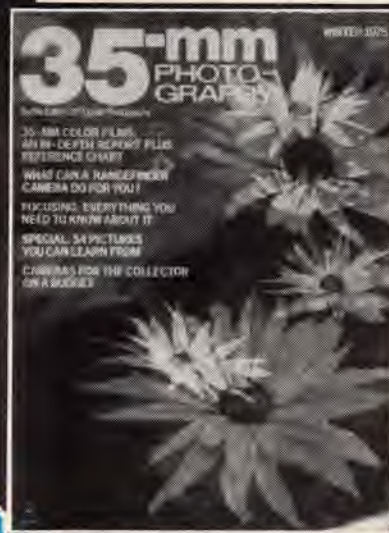
If we wade through the mass of data for some of these tests, we can conclude that certain characteristics of vision vary from person to person and from hour to hour with each individual. Consequently, any grading of image quality based on visual evaluation must be regarded as quite subjective.

For this reason, perhaps to the exclusion of any other, one person may be content with a lens that another person would sneer at. The reason? The person who likes the lens may really like the *images*, while the one who holds the lens in contempt may not. It takes a trained observer to look at a picture of an emotion-evoking scene and not become emotionally involved. When this observer is asked to evaluate the image against another one in terms of optical fidelity, the emotional response is dialed out and only the question of optical fidelity is regarded.

It's easy to construct examples of how pictorial or emotional content can influence the opinion of the average person asked to grade pictures in terms of optical fidelity. Perhaps this is why Eastman Kodak's standard test target consists of an array of photos of a small boy holding a puppy. Certain other details such as fine geometric patterns also appear on

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MY LIFE WITH A 35-MM

A miniature-camera aficionado looks back over forty-plus years and how a mighty midget grew

BY JACOB DESCHIN

To a generation brought up and thriving on the 35-mm concept, it may seem unbelievable that the miniature ever needed a defender. Yet, in a book published in 1947, when the 120 twin-lens reflex, led by the Rolleiflex, was in its heyday, I find myself the author of the following:

"... I'd like to put in a word for the miniature, which seems to be dethroned in favor of the new champion. No discussion should pit the 35-mm against the twin-lens. The twin-lens reflex camera is excellent for all-round picture-making. I know because I've owned several during the course of the past 10 years [the first Automatic Rolleiflex was put on the market in 1937, by coincidence the year POPULAR PHOTOGRAPHY was born, and I was among the first to acquire one]; I make most of my pictures with the one I now own; and I wouldn't part with it for anything.

"But I still favor the 35mm for its compactness, its extreme portability, its wonderful flexibility and the fact that it is always handy for candid pictures and unexpected shots. The twin-lens can also be used successfully for candid shots but the miniature camera is definitely superior in this respect."

I had in fact been using a 35-mm camera since early in 1930 when I traded my 4x5 Graflex (plus \$50) for my first Leica and the start of an exciting new life in photography that has lasted more than 40 years.

When I first picked up the Leica my main thought was to see how well I could shoot pictures under a diversity of chance lightings, usually unfavorable for normal exposures. Under the motto that "where there's light there's hope" and the concept that any kind of illumination that makes a subject visible to human

In 1949, when I asked the late Robert J. Flaherty (top) for an interview, he suggested we meet at his friend's, the sculptor Davidson, where I took this picture. Below, an early 1930s candid by candlelight.





Taking candid at night through windows (top) was a favorite activity, this one soon after acquiring my first Leica in early 1930s. Below, a familiar corner in Manhattan's Greenwich Village, popular 35-mm target.





Edward Steichen (top) on way to receive Rochester honor in 1950s; with him, Tom Maloney and the late Joseph Dombroff (Willoughby president). Center, wartime party in servicemen's center, by remote flash. Right, locksmith on New York's East Side, picturesque area for candid in the 1930s.



Wartime window demonstration (top) for future fighters. Center, leggy shot with Rollei during girls' baseball game at Patterson Field (Ohio). Below, low-angle shot with Rollei—street-level mirror reflections on Fifth Avenue.



sight will render the subject visible to film emulsion in a camera, I sought and used such apparently unlikely devices as candlelight and match light, the flame of gas jets, the hot breeze heater's luminous coils of resistance wire, street bonfires, political torchlight parades, the light from a kerosene lamp, the light cast by the moon on clear nights, lightning, fireworks, and so on. A portrait could be taken with two seconds' worth of candlelight; pictures could be snapped by matchlight at the moment the match is struck to light a cigarette or a pipe; a diffused illumination could be achieved by gently blowing smoke into the flame. The faces of children or workmen gathered about a bonfire in an open lot or street under construction were nicely lighted. Photography by the light of automobile headlights as the vehicle moved along street or highway, with lens wide open, recorded streaks of light on the exposed film.

Theater photography from an orchestra or balcony seat offered the compensation of "taking the play home with you." With body propped against the back of the seat, elbows against one's sides, and camera steadied against one's nose, you could take stage shots at 1/10 sec. A useful steadying device was the chain unipod, with one end screwed into the camera socket, the other dropped to the floor and held firmly by one foot as the photographer pulled the camera taut while leaning backward against the seat.

In candid photography the trick was to catch gestures and situations without the subject being aware of the camera's presence. A most challenging time was of course the night, when the photographer had the best chance of being unobserved while stalking likely subjects, and so I became a night prowler with a camera, snagging such prizes at 1/10 second as a window dresser working by low illumination, brightly lighted display windows that beautifully illuminated window shoppers, and even unusual window displays for their own sake. The illumination from windows also provided enough light in some cases to record interesting street incidents and passersby.

It was not all steal-and-run candid picture-taking, however. The miniature's convenience made it possible to carry the camera around at all times, in readiness for such small discoveries as old doorways, patterns of light and shadow, street hawkers, angle shots at

buildings, and hosts of picture ideas that have since become clichés through frequent repetition.

Street photography has always been a popular camera field, but it is doubtful if it has ever enjoyed such wide photographic exploitation as it has since the advent of the miniature camera. Being small and relatively compact it was easily brought into shooting position and was simple in operation and could be carried about on almost all occasions, a fact that suggested the chapter title in one of my books, "Take Your Camera to Work" and the invitation to "make it a habit to pick up your camera in the routine way you pick up your hat and coat as you leave the house" and ride the train, bus, trolley, or ferry on the way to work. Following my own counsel, I was hardly ever without a camera and to this day often feel guilty going off and leaving the camera behind, frequently to my regret when I run across a "find."

Inspired by the handiness of the miniature and its eagerness to embrace all life, my visual interests grew to encompass such variety of pictorial opportunity as taking pictures from the window of my home, from my seat on the now practically vanished El system, from high office windows, from outdoor subway platforms, and such. The park was a natural—and still is, for pictures of both man and nature—clouds offered picture subjects in themselves, tree branches have been useful as frames for other subject matter. Zoos, bridges, arches, fountains, statues, and architectural details, among other subject matter, filled out an ever-increasing panorama of things to shoot.

People frequently ask me whether I do photography professionally; my answer invariably is that although I often use my own pictures to illustrate my writing on photography, I consider myself an amateur, not merely "at heart," as the saying goes, but actually. I have been through many cameras, from the 8x10 (a brief and not a very happy experience) to the 3 1/4x4 1/4 and 4x5 Graphic, Graflex, and view cameras. I still have a 4x5 Linhof and a 4x5 Cambo view camera I bought several years ago with every intention of doing "serious" photography with it, whatever that may mean, but have yet to put it into service. And of course there are the Rolleiflexes of the 1940-1950s, the Hasselblad, and miscellaneous other 120 cameras I have

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The late Gene Tunney and Lowell Thomas readying for a game (right). Center: using Rollei for a change I hid in doorway to snap shutter as couple came by. Below, picture-framing technique was helped by El structure.



PRINT QUALITY:

Does it mean the same thing to you as to me? No? Good—then we have something to talk about.

BY RALPH HATTERSLEY

It's about time to take a very careful look at print quality, for it has become a sacred cow. Though most photographers love it they have good reason to fear it, too. Looking at it in the wrong way has ruined many a photographer and at one time nearly destroyed our largest society of salon photographers, the Photographic Society of America. To the photographer with an inadequate viewpoint, print quality is like a monster sitting astride his shoulders refusing to let him move and fully express himself. He knows that something is wrong, but usually can't put his fingers on it.

As you will see, there is nothing wrong with print quality as such; we could hardly get along without it. The problem is our inability to see the many kinds of print quality objectively and to use them freely. Failing in this we limit ourselves to one or two kinds and try to make all our pictures fit them. This severely limits our picture taking and our possibilities of self-expression. Since thousands of photographers have fallen or been pushed into this trap it is high time to rescue them. Remember that the basic problem is narrowness or inadequacy of viewpoint. It is *not* how to *get* this or that kind of print quality, for such things can be learned with relative ease. The real challenge and need is to stretch the mind, for then the print quality problem will disappear.

The fact that print quality is very seldom viewed from a large enough perspective is a good indication that it has actually become a sacred cow. Our main way of defending our idols is not to look at them very carefully except on a superficial level, which certainly applies to



A picture made with the Sabattier effect (solarization). Many photographers will say that such a picture has quality if the effect merely works, disregarding everything else about the image. This shows that people have some rather strange notions about print quality. In this case a rather weird image was matched to an effect that is also weird—there was no guesswork about it. Though it comes within the morbid gray realm, it will probably be forgiven for this, because the solarization obviously worked.

To my eye, the lighter print is an excellent record of how this cherub actually looked when I found her, and it suits me to a T. However, some people have a power hangup in their printing and want everything to come out strong and bold, as in the darker print. Well, I like it too, but not as much as the more delicate one. True, the added contrast makes the cherub more three-dimensional and substantial, but I prefer him-her more ethereal. The black background completely falsifies the time of day, which is entirely legitimate if that's what one wants.

print quality. Photographers talk about it endlessly at the shallowest depth: Does a given print have it? If not, what could be done to improve it? In this context, print quality is seen as consisting mainly of tone, contrast, and local manipulations of tone and contrast through dodging, burning-in, and bleaching. As we will see in a moment, tone and contrast cannot be divorced from the contents of a picture, or from what the photographer intends it to say or do.

Photographers who use this limited approach usually come up with answers that satisfy them, which is one reason they don't push their thinking further. They are just not interested in speculating on what the over-all concept of print quality is about. They are only concerned with getting this or that kind of quality in their own photographs, not in understanding its underlying meaning. Indeed, the very thought that print quality might have something to do with meaning would be a laugh to many. To such people it is merely something that a picture does or does not have, and that's the end of it.

However, people who thus limit their thinking on print quality to questions of tone (exposure), contrast (paper grade or negative contrast), and dodging, burning-in, and bleaching (local control of tone and contrast) are often the very ones most tightly trapped and limited by their narrowness of attitude. Because they sometimes function well as photographers within a restricted area, they

may not realize they need rescuing, too.

My rescue attempt will consist mainly of showing that a narrow viewpoint on print quality is indeed a serious problem, that it is promoted mainly by pressure groups, large and small, who are blindly following certain print quality traditions, and that print quality can be looked at in such a way as to free oneself from unduly restrictive influences. Then I will describe an approach to thinking and talking about print quality that is effective for both individuals and groups (classes, camera clubs, seminars, conferences, and informal gatherings). Though I don't wish to be controversial I'm afraid there is no alternative. There is absolutely no way of analyzing a sacred cow without being thought an iconoclast.

I have said that photographers are mainly uninterested in the meaning of their quality concepts, and many seem unaware that they even have them. Nonetheless, they are by no means reluctant to force their quality ideas on newcomers to photography—as teachers, writers, professionals, and friends with greater experience with the medium. In truth, being a student in photography consists largely of having such notions rammed down your throat so often that you eventually either learn to accept them or give up photography. Make no mistake of it, the pressure is very, very strong.

Perhaps this wouldn't be so bad if our print quality concepts were a gift from the gods, but they are hardly that. Unfor-

tunately, they are narrowly and fallibly human, inventions of that relatively small portion of the race who call themselves photographers. Though they are built up on firm foundations they are still quite obscure and not nearly broad enough. One thing that should lead us to question them, perhaps with the idea of improving and expanding them, is that most non-photographers aren't even vaguely interested in them and see no reason why they should have been given importance.

Photographers say this is because the outsiders can't see very well, but they are only evading the issue. The truth is that the non-photographers have just not accepted photography's quality concepts, which amount to an agreement that everyone will see things the same way. This is hardly a crime. How well they actually see is another matter entirely. Indeed, there are multitudes of non-photographers who are much more perceptive than the average photographer. The commonly held notion that becoming a photographer teaches one to see should be viewed with great reserve, for many use the medium to narrow their perception rather than broaden it. In fact, one of the easiest ways to put blinders on oneself is to attach oneself too strongly and with too limited a perspective to the very quality concepts the outsider is criticized for not having.

The foregoing paragraphs suggest that the sacred cow, print quality, is not quite as invulnerable as most photographers seem to think. Actually, it is very vulnerable indeed, if we are but willing to see it. Our objective for this should be to make our quality ideas more useful by making ourselves more aware of what they are and how they work.

Before continuing we should try to see what print quality consists of and look at the basic concepts that seem to govern most photographers in their printing. Then we can dissect the concepts to see where they came from and what they have led to. You will see that many are very restrictive and reactionary but that a few are quite all right if looked at from the right viewpoint. We will expand on the latter to show how they can affect our photography in an interesting and meaningful way.

In a limited sense, print quality consists only of what can be done with printing paper, an enlarger, dodging and



burning-in tools, and chemicals. We can have images that are in focus or out and cropped in certain ways. The exposures can be from short to long, resulting in over-all print tonalities from light to dark. By selection of paper grade or printing filter we can exert considerable control over image contrast. This contrast can be increased slightly or decreased very considerably by developer manipulation.

By dodging or burning-in of local areas in the print we can control both their tonality and their contrast. (When areas are either lightened or darkened considerably they lose much contrast. Dodging an area can increase its contrast with adjacent areas.) By using Farmer's reducer after processing we can either increase or reduce the contrast of the print as a whole, or make these increases or reductions locally. Over-all contrast increasing is done with a print deliberately made too dark, which is then bleached down to "normal." Contrast is reduced by bleaching a print until it is lighter than normal. Local contrast can be either increased or decreased by adjusting the relative tonalities of adjacent areas.

If all these things are done well we should theoretically get good print quality of one kind or another. However, it doesn't necessarily work out that way, even if one is printing a technically perfect negative. This essentially means a negative that records all the important details of a subject and compresses its tonal range so that it will reproduce on an available printing paper. The problem is that many such negatives, no matter how one prints them, will not produce pictures with what will pass for good quality according to any of the current notions concerning acceptable quality. You must understand at this point that the idea of quality acceptable to others and to photographic traditions is a very important part of the whole print quality question. Later we will see if this is a good thing.

At any rate we have to drop the definition of quality just given, simply because it will not hold up. Just as beauty is in the eye of the beholder, so is print quality in the eye of the photographer—when he is taking his photograph. It starts all the way back there. If he recognizes a subject that will translate two-dimensionally into print quality, then that's what he'll get. If not, he's completely out of luck and no darkroom tricks will save him. Thus we could say that everything a photographer does when making a picture has an effect on what kind of print



Three equally valid ways of printing a tree. If people find the light and dark versions a bit hard to stomach, I wouldn't be surprised—they're not supposed to be like candy apples. Both are morbid (to my eye), but the dark one has more gothic razzmatazz. The light one is mushy and morbid enough to give the average photographer a bad case of dry heaves. The middle print is sort of neutrally treeish.

Now that we have finally awakened to what we are doing to the ecology, photographers are beginning to express their distress in pictures. The light print shows what this upsetting violation of nature's beauty actually looked like (to my eye), but it is too neutral and pretty for some defenders of the ecology, who really want to rub people's noses in what is happening to the world. Thus they make prints like the dark one—a kind of gilding the lily in reverse.



Distortion created by printing on curled paper. It goes along with the intentional wackiness of the woman's expression. Nowadays, deliberate distortion in pictures is quite permissible, but in former times it was equivalent to throwing rocks at your mother. This helps to show that the canons of acceptable quality are gradually expanding. With the paper radically curled it was impossible, even with massive burning-in, to carry the dark tones to the top and bottom of the picture. But this really doesn't matter anymore, especially because the whole picture is overtly nutty. So, if a few tones don't do what you think they should do, who cares? I say it's an excellent print.



quality he will get.

The following definition takes this into consideration: Print quality consists of contrasts, tones, textures, patterns, shapes, edges, sharpnesses, softnesses, color, and everything else whatever that is visible within the picture area. In any picture, such things have to exist in some kind of a relationship. If it is a "good" relationship the print quality is also said to be good, if not, inferior. In this definition we go well beyond thinking of tonality or contrast in the abstract, because we are asking *what* should be light or dark, flat or contrasty. From here we can easily go to *why*—why make a print this way or that? If we leave out the *why* we might just as well turn over photography to the apes.

It should be understood that the whole idea of print quality rests on various ideas about "goodness," which few people bother to analyze carefully. In order for a print to be "good," a whole lot of other things also have to be, starting with a good subject, good picture idea, good lighting, good composition, good tonal separation and distribution, etc. Without these things there is no chance of getting a "really good" print.

The picture then has to be made at the decisive (good) moment. We need a good exposure, at an appropriate (good) shutter speed. And we should use an f-stop that will give us the right (good) depth of field in terms of what we are trying to do with our picture. In such manner we translate a variety of "good" things with respect to the subject into reversed tones in a negative.

Printing consists of converting the reversed tones into positive ones, manipulating the density and contrast (over-all and local) to make sure that the original goodness of the subject is recorded as accurately as possible or improved upon. In terms of accurate recording, print quality can be built into the negative to such a degree that it can be run through an automatic printer and a high quality print will come out.

The notion that print quality is mainly incorporated in the negative is an important one. However, when quality is partly lacking it can often be added to by manipulations (dodging, burning-in, bleaching, etc.) during the printing process. Though it is also possible to change the image around entirely while printing, the negative has to have enough "latent print quality" built into it to make this possible.

I drew attention to the word "good" for several reasons. People often use it as a substitute for thinking. They can be

programmed to think certain things are good, then because the term seems to block thinking and favor emotion they find it difficult to question their beliefs, though they will defend them vehemently. When we can't question our beliefs we are severely limited, crippled in fact. This is a large part of our problem with the print quality traditions, which have such an enormous influence in photography. We are talked into accepting them in terms of "goodness," then turn them into a sacred cow we don't permit ourselves to question. Perhaps this wouldn't happen if we could constantly remember that "good" is one of the most dangerous words in the English language.

The notion of latent print quality is supported by Ansel Adams' Zone System and his concept called "previsualization." When we look at a photographic subject and start to previsualize we are essentially analyzing the print quality latent in it, figuring out how it can be increased, and trying to see in imagination how the modified subject will look in the resultant print. These modifications are mainly for increasing or reducing contrast, which the Zone System per se is used for.

The important thing to see here is that print quality exists even before the camera shutter is clicked. In a latent form it is in the subject, in the photographer's eye, and in the negative. Thus when we think about print quality we should see photography as a continuing process, of which the print per se is only an organic part, just as a person's head is only one part of his whole being. What we do in the printing room is merely confirm, intensify, or modify the already existent quality that the negative transmits from the subject to the print. One virtue of studying the Zone System is that it helps make some of these things clear.

We will now look at some of the ideas of visual goodness that go to make up print quality as we know it, bearing in mind that many photographers don't verbalize such things but are dominated by them on the unconscious level. We will begin by stating a number of these notions in the simplest form, then examine them later to see how they affect photographers. As you will see, some of the concepts are narrow in scope, others quite broad.

A photograph has good print quality:

1. if it has a deep black, a clean white, and a long range of grays in between.
2. if it has great carrying power (high vis-

The Smithsonian Institution in Washington, D.C., a building of dark red stone. By lightening the stone and reversing the perspective (the printing easel was tilted) I brought out the latent fact that it is really a fairy castle. If the fairy quality hadn't been so strongly embodied in both the building and the negative I just couldn't have been so sure that it would come out in the print. As far as printing itself is concerned, it consists largely in assessing the things latent in the negative, then bringing them out through a process of tone manipulation, which is actually all that printing is.

In the text I say that ideas borrowed from painters and artists in other media have helped us keep the print quality traditions constantly expanding to include more and more kinds of quality. This helps photography become ever more adaptable as an expressive medium. When making this print from two sandwiched negatives I was strongly aware of borrowing heavily from Georgia O'Keeffe's paintings of skulls and bones and imparting that quality in the picture. In contrast, artists in other media have often borrowed the multiple, overlapping image idea, which originated in photography.





Photographers such as Harry Callahan and Duane Michals have helped expand our concepts of acceptable quality by their constant experimentation with the medium and their great prestige. One idea that both have played with is to over-expose heavily areas of a negative, then let them wash out to a blank white in the print. Before their time this was considered almost criminal, but photographers can now do it any time they like without threat of reprisal. As you see in this print, the result of this technique can be rather weird, but weirdness is one of the things that people find entertaining. When it is communicated through light tones, rather than dark, it is also rather unusual.



ibility and clarity).

3. if it has tonal richness, or brilliance.
4. if it is emotionally uplifting (to photographers).
5. if it fits the standards of an established category of print quality.
6. if its particular kind of quality fits its subject matter according to print quality traditions.
7. if its particular kind of quality closely resembles that of a famous photograph, or the print quality of a famous photographer.
8. if it is beautiful.
9. if it looks very much as if it were a well-done work of art in another medium.
10. if photographers in general like it.
11. if it shows what things really look like.
12. if it shows reality looking its best.
13. if it communicates its intended message well.
14. if it functions as its maker intends it to.

I think this covers all the main print quality concepts that dominate photography. Many have been in force for more than one hundred years and show no signs of losing their power over photographers, who are strongly pressured into accepting them. Part of their power comes from this forced acceptance, more of it from the fact that people don't realize what they are welcoming, so that they tend to use it on the intuitive level without really thinking about it. This mainly unconscious use of quality concepts is promoted by the fact that they are forcibly stuffed into people when they are still beginners and lacking the overview of photography that would enable them to do their own selecting. Taken in this way they easily become a part of the photographer's unanalyzed frame of reference. From there they act like rose-colored glasses, changing everything that he sees.

You may wonder about the fuss and bother, because these concepts certainly seem harmless enough. In truth, they can be—if one uses them flexibly enough, combining them, skipping around, adapting, interpreting them freely, and so on. From this perspective the list would be useful as a guide for teachers of photography. The problem is that people tend to limit severely the number of print quality concepts that they will accept, then proceed to trap themselves in just one or two of them. You would be surprised at the narrowness of a concept that people will cling to in their desire to make "good" prints.

For example, you might find it hard to
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JILL KREMENTZ



Unofficial Photographer-Laureate for the Contemporary Literary Scene

BY DOROTHY GELATT

A Nikon House Gallery exhibit in New York recently summed up one of the smartest working techniques a photographer can use today: Specialize!

Jill Krementz does, and the full force of her working success emerged at her Nikon House Show, "Famous Writers and Other Personalities."

Miss Krementz' career has been colorful and varied since she left school and started working in her dream city, New York, in 1959. But she finally jelled as a photographic personality after she started specializing in pictures of authors and literary figures as a free-lancer in 1970. Her specialty set her apart from the crowd in two ways. First, it enabled her to concentrate and build up a portfolio without scattering her shots in the mammoth mixed bag of New York photography. And second, she picked a specialty that hadn't yet developed in America, so she had relatively little competition. Rollie McKen-

na, and more recently Tom Victor, specialized in photographing poets. And in Europe Jerry Bauer free-lanced authors widely throughout England, France, and Italy.

But in America, Miss Krementz looked around her and realized the field was pretty much untapped. So she decided to tap it. And she had everything she needed for the job: camera experience, guts, determination, contacts, a consuming interest in reading and in the people who write books, and the whole New York publishing scene to plunge into. In a brief four years she built herself an author portfolio that made her a personality in her own right, meeting scads of interesting famous people, and earning a good living.

What if she had been in Podunk, or just out of the New York mainstream? Would she still have gone the specialty route? "Certainly," Miss Krementz says. "I would find something to specialize in no matter where I was. You don't have to be in New York. Wherever you are you can just look around and see what needs doing and do it."

Jill Krementz' entire career is a fascinating example of the work, effort, organization, business sense, and drive that can lead to a successful photographic life no matter what area you may choose. She has been

reaching toward her goal ever since she left school and is proud of her success.

In her working career, Miss Krementz is a one-woman band. She takes and sells her pictures, unlike many photographers who loathe the selling bit. This eliminates agent's costs. She photographs on location and thus is not saddled with studio expenses. She works from her home base, which makes her office costs minimal. And to keep herself free to go any place any time, she employs a secretary, an answering service, and uses a first-rate lab for processing and printing her films.

"She's a whirling dervish of activity," one of her clients explained.

How did this "whirling dervish" succeed in the maelstrom of New York photography? *By really trying!* Jill Krementz knows all the tricks of the trade. In fact, she invented some of them, according to both her admirers and detractors. "That girl knows what she wants and she really goes after it," one editor said, requesting anonymity. "Apparently *nothing* stops her. If she wants to take someone's picture she'll make any effort she can think of to get it. She'll heckle all his friends for an introduction. She'll stand on his doorstep. She'd probably lie down in front of a truck if it would help her. But by God she'd get



John MacDonald takes his successes lying down (above). And Katherine Anne Porter relaxes with some familiar literature by her side (next page).







KREMENTZ *continued*
the picture."

One observer called her "The Ron Galella of the literary world." But he smiled fondly when he said it. And at her Nikon House show, a famous photographer told a famous author: "This show represents the world's greatest collection of chutzpah."

None of these comments reflect Miss Krementz' own working philosophy. As she explains it herself, "I do my homework. I read *Publisher's Weekly* continually to keep up on new books in the works and on authors' plans. And from working all these years I know a lot of people in publishing and public life and I hear about things early. So by the time a book actually comes out and the magazines and book reviews are scrambling for fresh pictures, I already have them in my file." With Miss Krementz it is simply a business fact of life that you keep your inventory up to date, as well as maintain a good back-list.

Her effort, her ingenuity and her stamina have paid off amply for her, especially in the last couple of years when the "Jill Krementz" credit line has appeared alongside so many au-

thor pictures that you might get the impression she's the only person on planet earth who photographs writers. Actually, this is not the case at all. Other people *do* photograph writers. They just don't do it with the concentration or cumulative effort of Miss Krementz.

The Sunday *New York Times Book Review* section has sometimes been accused of hiring Jill Krementz to the exclusion of all other photographers, because her pictures turn up there so profusely and so regularly. Actually nothing could be further from the truth, according to Margaret Berkvist of the *Times Book Review*. "We have practically never given Jill an assignment," Maggie Berkvist explains, "and she has always laughed with us about the couple of things we did assign her, because they never ran."

"The reason we have carried so many of her pictures is that very often she is the only photographer who has what we need when we need it. Other people photograph authors, and we use lots of their pictures. But nobody has quite pioneered in American authors the way Jill has. Jill really hustled, and worked hard and kept it up.

She went out and took pictures of authors all over the place. Then she came back and said to people like *Time* and *Newsweek* and *The New York Times*: 'I've got the pictures—here they are.' By now I guess she's made it pay."

Miss Berkvist flipped through the Sunday *Times* records of Krementz photographs and was surprised to note the way they had slowly built up. "I first knew about Jill after her Viet Nam pictures in 1968," she said. "Now let's see here. In 1966 we ran two author pictures. In 1969 one. Three in 1970. In 1971 she really got started with us. And in 1972, my goodness, she took off. We must have run something of hers almost weekly. In 1973 we ran somewhat less. And of course the total isn't in yet for 1974."

"The way we work at Sunday *Times Book Review* is: when a new book comes in that needs illustrating, we'll call in proof sheets from all the photographers we know of who are working in the field. We choose what we need, in terms of layout or literary considerations, strictly on the basis of



Krementz easily catches the Kurt Vonnegut intensity (left); Jorge Luis Borges chats with wife (top); and S.J. Perelman poses upon a steamer trunk headed for New York City.





One wall is lined with full-size filing cabinets containing proof sheets of all her work numbered chronologically. A loose-leaf notebook, by subject alphabetically, is keyed to the proof-sheet numbers. The bulk of her negatives, bearing matching proof-sheet numbers, is on file at her printer, Meridian Photographic Laboratories Inc., in New York.

Erika Leone does her printing at Meridian and understands Miss Krementz' style and the print quality she wants. "I am essentially a journalist," Miss Krementz says, "so I want adequate prints for reproduction."

The prints for her Nikon House Gallery show were of superb exhibition quality, and were printed especially for the show, giving the pictures an extra panache that does not come through in standard magazine or newspaper reproduction. The same superb quality prevailed in the show's outsized prints made by the Modern photo mural division. The whole show carried the visual snap that cannot happen without superb printing and a lot of special hand work.

When a call comes in for photographs, Miss Krementz or her secre-

tary can immediately pull the appropriate contact sheets from the file, leaving a cardboard marker to indicate that a sheet has been pulled and not yet returned to the file. They can then either send out contact sheets for the client's selection, or order specific prints by number over the phone to the lab. All pictures ordered are entered in a daily diary order book, and checked off to complete the transaction. A notation of the sale is made in the subject notebook, which thus contains a complete history of where the picture has appeared. After the job is delivered, the contact proof sheets are returned to the file, the cardboard marker removed, the bill mailed out, and the transaction is completed.

The secretary does bookkeeping, billing, and general office chores of every sort. But Miss Krementz herself plows straight in to anything she feels requires her personal attention. She will, for instance, sit right down and type her own letter to a publisher who has neglected to run her credit line agreed to when she sold him the picture.

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the pictures. Often we have a lot of proofs lined up to choose from and we aren't really aware of who took what until we make our final choice and look on the back.

"So Jill doesn't have more or less of an edge than anyone else when it's a case of competition. But often there is no competition. She'll be the only one with pictures, and that's it. Of course publishers usually have their own jacket photographs, and when they do we'll usually contact their photographer for other shots of the author because we like to use something fresh and different. But Jill has gone after the book jacket trade too, so she's in it from both ends quite often."

Miss Krementz' work at the *Times* is only the tip of the iceberg as far as her working methods are concerned. Over and over again she is described by people who work with her as "a shrewd business woman and a complete pro."

"I am organized," Miss Krementz explains, and her work-room in New York is the heart of her organization.



Groucho quips as Krementz snaps (left). Above, cover photo from *Sweet Pea*, a photographic account of a Black girl growing up in the rural South. At right, cover photo from *The Face of South Vietnam*.

35 in 10

What has our favorite format
been up to in the last decade and where is it at now?

BY W.L. BROECKER

One of the outstanding characteristics of photography has been change, especially in the field of 35-mm. The growth and development since the early 1950s has been astounding; it seems that things just won't stand still long enough for any of us to catch up with them. The constant drive for real, or apparent, progress in equipment and materials has made 35-mm into a world with an incredible number of cameras and lenses, with a bewildering array of features, and a mountain of accessories. The bulk, diversity, and complexity of it all are overwhelming to photographer and camera store owner alike. Never have we had so much to choose from, of such diverse appeal—and thus never has choice been so hard. It is a great temptation to lapse into a glorious fantasy: "I'll take one of everything, please."

Software—the materials of photography—has also been rapidly changing. New processes and materials, which did not exist a few years ago, are sparking a surge in darkroom work, especially in color printing. Old favorite films, developers, and papers have disappeared, sometimes replaced by new, "improved" versions, sometimes just to be lamented by those who had come to depend on them.

What has gone on recently? Say in the last ten years—a convenient chunk of time because it is not quite as long as to get us into history, but long enough for some trends to have proved significant. And long enough for other developments that may have looked like geysers at close range to have revealed themselves as only minor spurts.

Where has change gotten us to? Are the improvements and new features really significant? Can we do more than



Popular Photography's Directory & Buying Guides, 1965, 1970, 1975

before, or do the same things more easily or efficiently? There is a recurring tidal wave of *new* that comes at least once each year: NEW camera! NEW lens! NEW meter! New film; new paper; new pogo-stick adapter mount. Does it really have meaning for us? Or is all that beauty only in the eye of advertising departments?

Intuition tells us that it is a mixed bag of the real and the imaginary; but how mixed? That is a major question from the standpoint of making the hard decisions that affect how well and how easily you can work: your choices of equipment

and materials. It is equally major from the standpoint of one of the most notable changes in a decade of photography: cost.

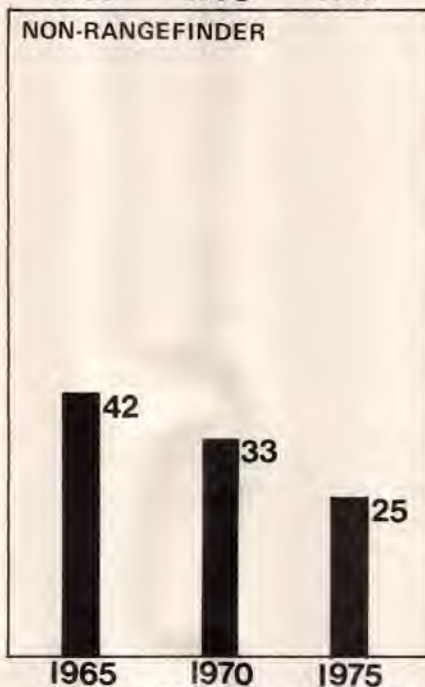
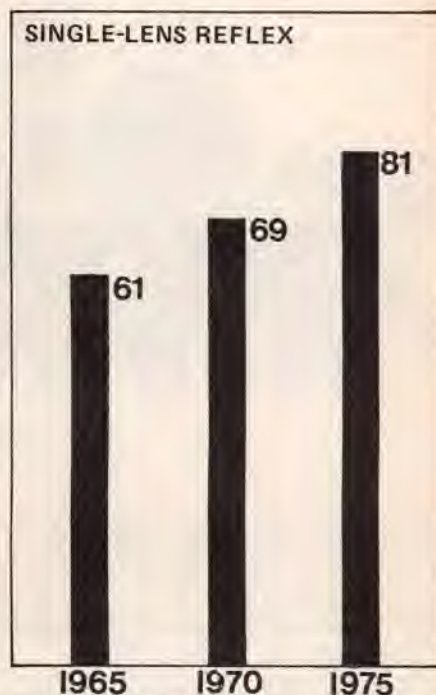
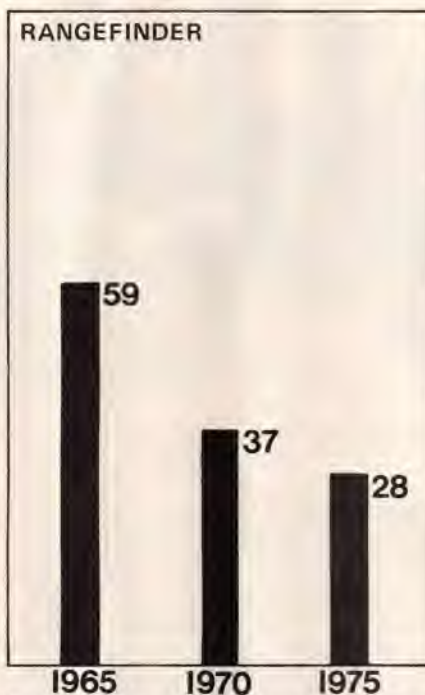
Photographers tend to be a moderately paranoid lot. Most of us harbor an uneasy suspicion that we are being taken advantage of by a seemingly unending succession of price increases. Although it is virtually impossible to find anything in our lives (not just in photography) that costs the same as it did ten, or even five years ago, we wonder whether photographic manufacturers aren't getting bigger slices of the pie each time prices rise. For the most part, the answer is no. If, for example, you laid out the equivalent of a week's earnings for a camera ten years ago, you would also have paid just about a week's earnings for a camera of

the same quality five years ago. The dollar cost might have risen, but so had your income, and the proportion remained just about the same.

However, in the past five years a number of factors have disrupted that balance. The chief factors have been accelerating inflation, continuing increases in the costs of materials without matching increases in the supply, and most recently the oil/energy disaster. While you and I are not making much more income, and in fact have reduced buying power, the costs of manufacturing have risen drastically.

Design and engineering talent and manufacturing labor are more expensive. Aluminum prices have climbed, partly because vast quantities of electricity are required to produce it and oil is burned to produce electricity—which also makes it a great deal more expensive to run machines and to operate electronic computers to work out the glass formulas and make the optical calculations that produce the new lenses we lust after. It is virtually impossible to buy a brass screw in a hardware store, and not very much easier on the industrial level. Plastics are directly derived from petroleum, and their manufacture uses more oil-created energy in the process. Paper products for boxes, shipping containers, and instruction manuals, as well as photographic printing materials, have jumped in price several times. Producing more advanced cameras and lenses requires more advanced, more automated tools, which in themselves cost more than ever before, along with everything else. The cost of producing chemicals has gone steadily upward, too.

It is not my mission to be an apologist for the photographic industry, but there is a good deal of justification for what has happened to photographic prices in the last ten years. Although there are some take-the-money-and-run firms, very few major manufacturers have raised their prices opportunistically. They are realists, after all, and know very well that there are a lot more potential buyers for cameras at \$300–600 than for cameras at \$700–1,000, so they are very careful to justify very high prices with very high quality. They know that they can push themselves out of the market with prices that attempt to get an



Ten years of 35-mm cameras, as listed in *Photography Directory & Buying Guide*



Major components of one manufacturer's system of 35-mm photography

unreasonable profit above their costs. But the cost-profit squeeze has been inexorable, and every established firm dreads reaching the point where it might have to reduce the quality of the product significantly in order to stay in the market: reputation, buyer confidence, service, and sales can quickly go down the drain.

The great economic test in photography is yet to come as our money problems continue. Up to this point we really have fared quite well; there is much more available to use, and a good deal of it is true improvement. What follows here is a highly personal, subjective look at some things that have gone on in 35-mm in the past ten years or so. It is not an all-encompassing catalog of major and minor developments, but a survey of a selected variety of changes, with some comments on their usefulness and some speculations on where we might be going (or be taken to) next.

To make this time trip back through the recent photographic past, I turned to the PHOTOGRAPHY DIRECTORY & BUYING GUIDE, compiled each year by the editors of POPULAR PHOTOGRAPHY, and compared listings in the 1975 edition with those in previous years.

These DIRECTORIES present a comprehensive selection of everything available in photo equipment and materials that might be of interest and use to the broad photographic public. *Some of the most specialized and highly technical items are omitted, as are some of the most duplicated or least*

expensive items (such as 69 cent disposable cameras). The aim is to provide information for the beginner in photography, as well as for the serious amateur and the professional. In doing so, the DIRECTORIES are extremely valuable reference sources, for they reflect the changes and developments in the main stream of photography from year to year. They are especially useful for researching 35-mm because, in response to the phenomenal growth of 35-mm since World War II, a major emphasis each year has been on that kind of equipment and materials.

There have been a lot of imitations of the DIRECTORY over the years, but none that I have found as informative. Early editions have increasing value to the growing market of photographic collectors—itself a significant development within the past decade, by the way. Of course pre-1945 catalogs, manuals, and sales lists command high prices, both as collectible items and as sources of information and identification for those little-known or forgotten pieces of equipment that collectors so avidly pursue. But directories and guides of only eight to ten years ago also recorded many items that have disappeared from the photographic scene, and they date the first appearance of many others that are with us today. Such publications should be carefully preserved each year; they rapidly become irreplaceable reference documents, with a value far beyond their original cost.

Although the field of 35-mm has grown steadily, much of the growth has been as refinement and consolidation of advances. As a result the total number of 35-mm camera listings has dropped

across ten years in the DIRECTORIES.

Two precautions are in order in looking at these and other figures. The DIRECTORY listings are as complete as possible, relying on information supplied by manufacturers. However, changes in production are planned well ahead of time, so that some models may have been dropped from the listings long before they disappear from the camera stores. In addition, a DIRECTORY is made up from the latest information available in the fall of a year; therefore, it is up-to-date for the very beginning of the next year—for which it is dated. For example, the 1974 DIRECTORY was up-to-date as of January, 1974. Cameras or other equipment introduced during 1974 are listed for the first time in the new, 1975 DIRECTORY, after they have become an accomplished fact. This procedure is the only way to avoid listing things that manufacturers may announce for introduction at a given time but subsequently postpone or drop altogether.

The accompanying chart shows the changes in 35-mm according to the kind of camera: rangefinder, non-rangefinder (viewfinder, waist or twin-lens reflex, scale or zone focusing, etc.), half-frame, and single-lens reflex.

Most dramatic is what has happened to the rangefinder camera. Ten years ago there was almost an equal number of RFDR and SLR models; today there are almost three times as many SLRs as RFDR cameras, and the actual number of RFDR cameras has dropped to only

THE EVOLUTION OF METERS IN CAMERAS



1965 selenium-cell camera



1975 compact rangefinder with meter in lens rim



1975 behind-the-lens-meter SLR

half of what it was.

There are a number of reasons for this impressive change, but they seem to boil down to a steady demand for an increasingly versatile, genuinely all-purpose 35-mm camera. That meant building in more and more features such as meters, exposure automation, information display, and easier operation. It also meant vastly increasing the range of available lenses, and that brought up a viewfinding problem.

The optical design of a coupled range/viewfinder system generally permits use of lenses from about 35-mm up to about 135-mm focal length. Shorter lenses, with wider angles of view, require that a supplementary lens be placed over the viewfinder and the rangefinder port to increase the angle of view accordingly. The optical viewing units for lenses for the Leica M-3 were one solution, but they were an extra accessory and therefore slowed down shooting—something that did not appeal to the growing body of young photographers who wanted to roam and shoot casually and freely with wide-angle lenses. In addition, the large diameter of short-focal-length lenses often obscured part of the range/viewfinder window so that the entire picture field could not be seen.

With longer-than-normal lenses, viewfinders either had supplementary lenses that moved into place to enlarge

a narrower field of view to fill the finder, or a pattern of concentric bright lines marking off the smaller field within the over-all view. This meant that you were limited to those focal lengths for which your finder had built-in compensation. There were practical limits on the number and strength of supplementary viewer elements that could be included, or on how small a portion of the field could be marked off before you essentially couldn't see enough to frame and focus accurately. One solution was to use lenses with their own built-in reflex viewing systems. Another was to insert an accessory reflex viewer, such as the Leitz Visoflex, between the camera body and the lens. The disadvantages of added bulk and weight, slower handling, and especially of greater expense are obvious.

The single-lens reflex principle overcame these problems. A few cameras of this sort had been available since the 1930s, notably the Exakta, but the big design and manufacturing push began in the 1950s and has matured in third- and fourth-generation SLR models during the last decade. There is a very large group—the majority of newcomers and students in photography—who have grown up with the idea that the SLR is the basis of 35-mm. Ten years ago everyone knew what a rangefinder camera was, SLR was still thought of as "new," and explanations of SLR principles and operation were still common in photography magazines and classrooms. Today the situation is reversed: few young photographers have seen or handled a full-size 35-mm rangefinder camera, and it has become the subject of explanation and

demonstration.

Since the SLR viewfinder shows exactly what any lens you can mount on the camera gives you, and shows it over the full area of the finder, there are virtually no limitations as to focal length. The SLR finder can provide focus indication over the entire picture area, rather than only in a central split-image or superimposed-image area, and it can show depth of field (although this is an overstressed feature because it is so difficult to judge accurately in the relatively small viewfinder image; there is no way to tell what the depth will look like in an enlargement). The SLR also can display shutter speed, f-stop, and meter reading data in the finder so that you need never move your eye to know what is going on in all aspects of the picture situation.

Because you can hook almost anything onto an SLR body and see what you are getting, this design has given great impetus to the *system* approach to equipment design. The major professional-quality 35-mm cameras today are SLRs, each surrounded by a supporting system of lenses and specialized accessories, all of which couple directly to the camera and metering system without special adapters or combination mounts.

The system idea really originated and grew with the Leica, a rangefinder camera, but even there the reflex-viewing Visoflex was required to make the system versatile. It took Leitz until 1965 to join the trend—led by Konica,



Canon G-III QL



Fujica GER



Konica Auto S3



Leica CL



Minolta Hi-Matic F



Miranda Sensoret



Olympus-35 ECR



Petri ES Auto



Ricoh 500 G



Yashica Electro 35 FC

Pentax, Nikon and others—that was threatening to leave them behind, and introduce their SLR, the Leicaflex. It was replaced by the Leicaflex SL in 1970, which in turn is being replaced in 1975 by the Leicaflex SL-2 with greatly extended meter sensitivity and increased information display in the viewfinder.

Cameras with built-in light meters were not a new idea in 1965, but the majority of meters looked through their own, external eye, rather than through the lens. And metering was still an option then; only half the SLRs, for example, offered a meter. Today, 90 percent of SLRs have a meter, and except for four or five models, every meter looks through the camera lens. The percentage of RFDR cameras with meters today is even greater than that, but those meters look through an eye in the broad rim of the lens, located there to keep the camera body compact and to provide direct control over the diaphragm or a leaf shutter. The only rangefinder cameras with behind-the-lens metering are the Leica M-5 and the CL.

Early camera meters used selenium cells. They were limited by the relatively low sensitivity of selenium to light and the fact that the cell actually had to generate the current to operate the needle movement. As a result, large-cell external meters were generally necessary and meter use was practical only in moderate and good light situations.

The introduction of cadmium-sulfide

cells turned in-camera metering into a major feature. CdS has far greater sensitivity to light, so that much smaller cells can be used and they can be located behind the lens, behind half-silvered reflex mirrors, or in the viewfinder, reading from the image on the focusing screen, and still provide useful reactions even under low light conditions. This usefulness is also possible because power to operate the meter movement is supplied by a separate battery in the camera; the CdS cell simply varies the resistance in the meter circuit in proportion to the strength of the light it "sees."

CdS has a bit of a problem in that it can be overwhelmed by very intense light and will not regain full sensitivity immediately. Thus you might take one shot of a light-colored subject in bright sun, turn to take another shot in dark shade, and get a "Don't Shoot" signal in your viewfinder or an underexposed picture. The CdS cell simply needed some time to recover from the bright situation. The newest meter cells are of silicon; they have immediate recovery so they adjust to constantly changing light conditions without lag, and they have much greater sensitivity to light than CdS. Silicon cells are being used primarily in fully-automatic exposure cameras at present, but they are certain to be used in most models of all kinds in the future.

The big development in camera metering in the 1970-75 period has been control by the meter system itself over some portion of the camera's operation. At first, in the 1950s, the photographer simply used his camera meter to get an exposure reading, but had to make the f-stop and shutter

speed settings manually. Next there were systems with the meter coupled either to the diaphragm, or to the shutter speeds. In one, you selected a shutter speed, then turned the lens aperture ring until the meter indicated correct exposure (usually by the matched positions of two needles, or a ring and a needle). In the other system, you selected an f-stop and changed the shutter speed setting until the meter gave an O.K. signal. A further development was cross-coupling of speeds and diaphragm with the meter so that you had the option of changing either to make the exposure adjustment.

Today there is increasing use of direct meter control. In a speed-priority system, after setting your camera for the exposure index of the film, you select a shutter speed and focus on the subject. If there is too little or too much light for the film at that speed, the meter will flash a warning in the finder; otherwise you can simply shoot. As you press the shutter release the meter automatically adjusts the lens opening to exactly the right diameter for proper exposure—which may well be some in-between, fractional f-stop that does not appear on any conventional scale.

In an aperture-priority system, you select an f-stop, focus, and shoot. The meter system uses electromagnetic control of the shutter to produce the exact speed for correct exposure. The speeds are continuously variable (that is, they are not limited to steps of 2x or 1/2x),

so if 1/659 second is called for, that is what you get.

In the most fully automated cameras the meter controls both aperture and speed. As you point the camera and focus, the meter automatically closes the aperture to a usable setting for the film/light combination; when you shoot, the meter controls the speed for proper exposure at that aperture. So far, only small cameras intended for the broad amateur market have used this combined control extensively. They are ideal for the person who doesn't want to concern himself with anything that seems even remotely technical. As such, they are the 1975 extension of the famous 1895 Kodak approach, "You press the button, we do the rest." Today it is the camera that does the rest.

The more advanced photographer and the professional want and need to retain control over camera settings, so automatic or semi-automatic operation are found as options on the cameras they choose. But much automation that first appeared only in amateur cameras is now available in the most advanced models as well, including electromagnetic control of apertures, speeds, and shutter releases, and the use of light-emitting diodes (LEDs) for information display in viewfinders. Such shutters make speeds of 1/2,000 second attainable, as discussed by

Wallace Hanson elsewhere in this issue; and the use of LEDs is just beginning, as Harold Martin's article explains, also elsewhere in this edition.

The continuous demand for a full-size 35-mm camera with ever more sophistication and system potentialities led to bigger and bigger, heavier and heavier cameras, until many photographers began to lament the loss of a camera like the early M-model Leicas. Thin, lightweight, and inconspicuous, equipped with a collapsible 50-mm lens, one could easily slip such a camera into a pocket, or hover around a situation—a la Henri Cartier-Bresson—with the camera nestled in your crossed arms and at the decisive moment raise it to the eye, focus quickly and positively, and with one hand click off a shot.

The SLR, for all its advantages, required two hands to support its weight and hold it steady as the mirror snapped out of the way and snapped back into position. The combined noise of mirror and shutter was considerably louder than the whispery "tchkl" of the RFDR shutter. In any sort of marginal light condition, SLR focusing was not as rapid and did not seem so precise: even at maximum aperture, the lens and reflex system reduced the light level in the viewfinder by one or two stops, and the scene momentarily blacked out when



Dacora D 101 rapid

the mirror moved. The rangefinder produced an image with no light loss or blackout at any time.

While the professional-level RFDR camera was dying off rapidly in the early 1960s, Leitz held the line. They introduced the M-4 Leica in 1968 when everyone else had gone SLR, and then met the demand for an in-camera meter with the M-5 in 1972. But the hearts of many photographers had sunk repeatedly when the M-1 had disappeared in 1966, the M-2 and M-3 went in 1968, and then the M-4 gave way to the M-5. Those models immediately began to command premium prices on the used market, and working photographers found themselves in fierce competition with the rising tide of photo history buffs and camera collectors, especially the huge band of Leica-maniacs who are rivalled for devotion and energy in collecting only by Rolls-Royce enthusiasts. (Some of the hearts that sank are rising to a faster beat with the rumor that Leitz may reactivate M-4 production in Canada, for sale in the United States.)

What evolved on the rangefinder scene was the compact 35. Small, lightweight, usually with a single, non-interchangeable lens, the best versions soon became a second camera in the kit of many professionals. Lacking the versatility of most SLRs, the compact 35

	1965	1975
Shortest focal lengths	8 mm f/8 Fisheye Nikkor	1.9 mm f/1.9 Alpa-Kinoptik
	9.8 mm f/1.9 Alpa-Kinoptik	6 mm f/2.8 Nikkor Fish-eye
Longest focal lengths	2000 mm f/10 Astro Telestan	2000 mm f/10 Telestan
	150-inch (3810 mm) Reflex-tar (mirror lens)	2000 mm f/11 Reflex Nikkor (mirror lens)
Fastest standard lenses	50 mm f/0.95 Canon	Various f/1.2 lenses: 50 mm Leitz Noctilux 55-mm Auto-Nikkor IC 55 mm Canon FD SSC and FD AL SSC 55 mm G. Zuiko Auto-S 57 mm Konica Hexanon AR 58 mm MC Rokkor-X
Greatest zoom range	(1:4) 50-200 mm f/3 Angenieux	(1:6) 50-300 mm f/4.5 Auto-Nikkor

Ten years of lenses



First Kodak Instamatic 100



Early Kodak pocket Instamatic



Dacora-matic 4D non-rangefinder



Olympus-Pen half-frame SLR

nevertheless could go more places and be used with greater speed, ease, and casualness. Outstanding models to my taste are the Rollei 35 and the Leica CL (which does have interchangeable lenses). There are several other very good compact 35s now offered, with increasing automation—which not every experienced photographer feels is a blessing, because at the same time manual control options are rapidly disappearing. The current state of compact 35 camera development was excellently surveyed by Leendert Drukker in the December, 1974 issue of *POPULAR PHOTOGRAPHY*.

Across the decade, the rangefinder compact 35 and the system-based SLR have emerged as the main branches of continued strength and growth in the 35-mm field. Two other kinds of 35-mm cameras have virtually disappeared: non-rangefinder models and half-frame cameras. There are only slightly more than half as many non-RFDR cameras as ten years ago, and only slightly more than a third of the number of half-frame cameras. (In fact, six of the eight half-frame models listed in the 1975

PHOTOGRAPHY DIRECTORY & BUYING GUIDE are alternate versions of full-frame Alpha cameras; so that the number of exclusively half-frame models is only two—one tenth of what it was.)

What happened? The answer is in two numbers, 126 and 110. The 35-mm cameras were simply replaced by cameras that were more satisfying to their segment of the market: the family album snapshotter who wanted a camera that was simple and foolproof to operate, requiring no exposure adjustments and even no need to focus, that held a small film load so that it didn't take six months or a year to use up the roll; and (above all!) that was simple to load. The non-RFDR and half-frame 35s had attempted to satisfy these amateurs, but the 126-size cartridge film load, introduced in the Kodak Instamatic camera line, virtually wiped them out. Agfa originated a countermove in the 35-mm "rapid" cameras, which used a fast-loading cassette to achieve 12 24x36-mm or 16 24x24-mm pictures per load. Dacora and Minolta also produced rapid cameras, but the whole movement was short lived. Rapid cameras were listed in the 1966, -67, -68 and -69 *DIRECTORIES*; in 1970 they had disappeared.

(Just to round out the story, the 110-size Kodak pocket Instamatic appeared in the 1973 *DIRECTORY* for the first time.

It is doing to the 126-size camera what 126 has done to non-RFDR and half-frame 35. There may be a moral concealed in that somewhere.)

When did various models appear and disappear in the past ten years? You can get some idea from the accompanying list of all 35-mm cameras included in the 1965, -70, and -75 *DIRECTORIES*. Notice especially what went on with the major manufacturers.

There have been other advances in camera features. Those relating to lens use and flash are discussed later. One of the newest trends is an upsurge in motorized film advance, enabling you to take two, three, or more frames per second. (When the rate reaches 16-18 frames per second, you essentially have a movie camera—and the need for a long roll of film.) Although not new, accessory and built-in motor drives will probably grow and develop significantly in the next ten years.

In general, 35-mm camera development in the past ten years has concentrated on refinement and consolidation of ideas and trends that

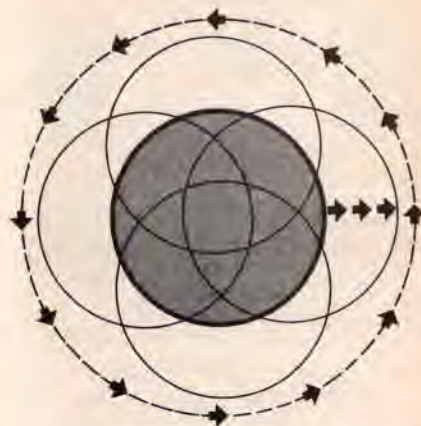
were underway or already on the drawing boards. Better models replaced older ones, but few companies created additional models. As a result, camera lines have deepened rather than broadened. We have seen an increase in quality and sophistication, rather than an increase in numbers, and that is to the good of everyone. But we still have far more cameras to choose from than we need, with almost exact duplications from manufacturer to manufacturer. And the situation is compounded by those companies that produce virtually identical models for sale by others, who each uses its own brand name.

If we have achieved an embarrassment of riches in cameras, the same situation has been astonishingly, even almost absurdly multiplied with regard to lenses. You can see what has happened in the accompanying chart. The total has increased by almost 300 since 1965—that's 2.5 new lenses a month, every month for ten years! No wonder we reel with optical doubt and indecision. But we are getting a lot that is significantly better than ever before.

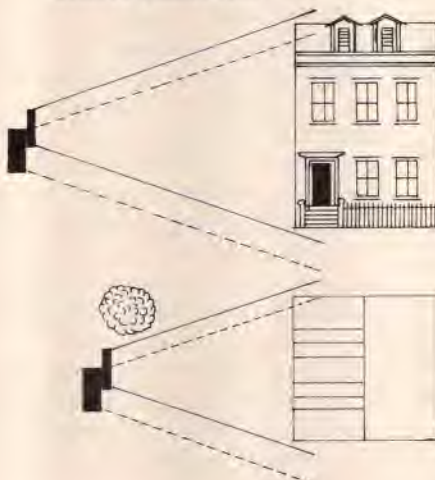
Interestingly, much of the growth has been in non-standard lenses. By 1965 almost all manufacturers had established the range of standard focal lengths—from extreme wide-angle to



28-mm PC-9 (for perspective control) Nikkor lens



Shift and revolve action of PC Nikkor.



Shifting element of perspective-control lens can rise to take in tall subject without tilting camera . . .

. . . or can shift to side to get head-on view without angling camera, in spite of foreground object in the way. Purpose of shift is to allow film plane to remain parallel to subject plane, avoiding distortion of parallel lines in subject.



Spherical curvature is fundamental to all traditional designs.



Constantly varying aspherical surfaces offer improved correction in some of the newest lens designs.

extreme telephoto—they would produce. Since then they have refined the design and production of those lenses and added some in-between focal lengths. But the newness has appeared primarily in such types as macro-focusing and mirror lenses (more than twice as many of each kind listed this year than in 1965), zoom lenses (more than three times as many listings now), and special types such as fish-eye and perspective-control lenses (almost seven times more!).

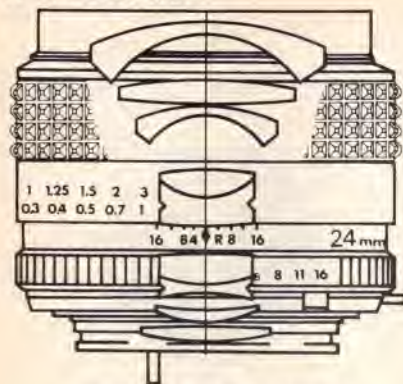
Among the things that happened to standard lenses in a decade are the following:

Diaphragms became overwhelmingly automatic in all but the very longest lenses (where mechanics and economics combine to make automatic

operation generally impractical). In 1965, 38 percent of the lenses offered preset operation: you select an f-stop with a setting ring, focus wide open, but turn the preset ring until it stops at the point chosen by the setting ring, just before you shoot. This allows you to close down to the desired stop quickly without having to take your eye from the viewfinder.

At that time, fewer lenses—35 percent—offered automatic operation: you set an f-stop on the lens, but the aperture remains wide open until you begin to push the shutter release; then a coupling mechanism automatically closes the diaphragm to the selected f-stop just before the shutter opens.

Ten years later, twice as many—71 percent—of the standard lenses for 35-mm cameras are automatic; only 18 percent have preset diaphragms. (In both years the remaining percentages



**24-mm f/2.8 MC Rokkor-X
with floating-element focusing**

are manual-set lenses.) In combination with this great change, the meter-coupling of automatic lenses has become far more sophisticated.

When camera meter cells first moved behind the lens, the meter read the light intensity at whatever lens opening was actually being used for viewing and focusing. If you worked wide open for viewing, you had to stop down (either manually or by depressing the shutter release part way) to get an accurate meter reading in order to choose a speed or an f-stop.

Now however there are full-aperture-metering lens-camera combinations. In effect, meter sensitivity is coupled to the f-stop setting on the lens, so that even though you view and focus at the widest aperture, the meter responds to the light as if it were reading through the selected f-stop. If you change the shutter speed setting, or the aperture ring setting, the meter will react accordingly, but you still have the advantage of wide-open through-the-lens viewing. Then, when you push the shutter release, the lens automatically stops down to the selected aperture. This seems to me the best kind of operation because you retain all your control and viewing options while making full use of automatic lenses and in-camera metering.

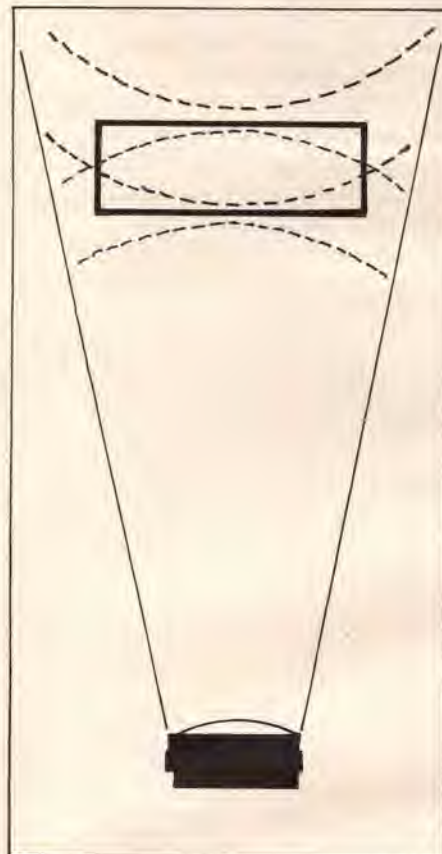
During the decade, some "flashmatic" combinations appeared. When flash is used, the camera-lens coupling is set to the proper guide number for the film speed and flash output. Then as you frame the shot and focus, the lens

aperture setting is changed to the proper f-stop for whatever distance you focus on. Push the shutter release, and the lens automatically stops down to the right opening just before the shutter opens and flash goes off. While extremely convenient and fast to use, flash-automatic cameras are fewer because automatic flash units (discussed later) are even easier to use and do not require additional camera-lens coupling.

The design of lens elements and element-grouping has continued to grow in sophistication and refinement. Electronic computers made it possible, beginning in the 1950s, to recompute classic designs far more accurately. They also made it practical to compute and compare many variations of a test design, including such factors as shifted element spacing or alternate kinds of glass, and to simulate optical performance under a variety of conditions. Millions of design and testing man-hours have been compressed into short computer times to solve new problems and get better answers to old ones. And then computers have been used to help create and operate machinery capable of producing the new lenses. The most recent developments that have reached the market have been in lens coating, aspheric design, and floating elements.

In the 1960s, new techniques were found for coating even thinner microscopic layers of flare-reducing substances on lens elements. In the 1970s new fluorite and aluminum compounds were used for coatings, and *multiple coating* of lenses began. Both advances further reduced flare from direct light sources and increased the contrast performance of lenses. Multiple coating was promoted widely as an earth-shaking innovation at first; now almost every manufacturer multiple-coats many of his lenses. But it has been discovered that not all lenses require it; some are already so free of flare problems that the improvement is negligible. And experienced photographers still swear by a good deep lens shade; there is nothing to equal it.

Classically, the curved surfaces of lens elements are designed as portions of perfect spheres; only the practical limits of mathematics, machinery, and glass have caused lenses to fall short of that perfection. However, computer analysis has confirmed that in order to get the greatest correction of



**New 24-mm VFC Rokkor lens can
curve depth of field to match
subject planes curved
toward or away from camera.**

aberrations, some lens designs should not be spherical sections, but varying, aspherical shapes, with the radius of curvature continuously changing from point to point over the surface. Only computers could calculate such surfaces, and only computers could help formulate new glass mixtures that could be ground to such shapes, or control the grinding machinery with the required precision for such a complex operation. Only the computer industry is more computerized than lens design, so we

FOUR CURRENT TYPES OF ELECTRONIC FLASH

are the beneficiaries. Aspherical elements are among the most recent innovations in lenses, and greatly improved performance is the reward.

Another problem in trying to limit lens aberrations is that design formulas deal with a particular spacing of elements. Change the relationship between elements, and you get a change in aberrations—and thus in the corrections required. With the simplest cameras the problem does not arise because the entire lens moves for focusing. But with most 35-mm camera lenses, as you focus a front group of elements moves toward or away from a rear group (or groups) of elements. So a lens corrected for aberrations at infinity may perform less well when focused at nearer distances. The way to counteract this problem is to include one or more elements that shift within the lens just enough to correct the aberrations equally well at each new distance focused on. Such *floating elements* are the very latest thing in lens design and, again, the computer did it. (Note: moving elements within a lens is not in itself new; zoom lenses use them to change focal length. But the use of elements that shift minute distances to provide correction of aberrations throughout the focusing range is new.)

Non-standard lenses have grown in number greatly in ten years. There are three times as many zoom lenses, and their optical quality has improved significantly, if not their range. In 1965, over half the zoom lenses had a 1:2 ratio; today over half the zooms have a 1:2.5 ratio. The big problem in zooms seems now to be economics rather than design. Motion pictures have proved to us that wide-range zooms for 35-mm with excellent performance at all focal lengths can be manufactured. But it is very difficult to provide such lenses at prices most 35-mm still photographers can afford. Too, there is a usage problem with zooms. Suppose you had a superb design with a range from 60 mm to 300 mm. What would you do about holding the picture steady beyond about 150 mm? A zoom with much telephoto capability is of necessity a camera-on-tripod lens, but very few 35-mm photographers are camera-on-tripod photographers. In addition, the greater



Ultrablitz/Bauer E16 small manual pocket model



Sunpak Auto 201 small, non-bounce, shoe-mount unit



Metz Mecablitz 402 professional automatic bounce unit with separate power pack



Metz 218 TR automatic four-way thyristor unit

the zoom range, the larger and heavier the lens becomes. Movie cameras have the bulk to accommodate this, and there are various stabilizing shoulder-waist supports for hand-holding them; 35-mm still cameras can't cope. Visually, apparent rendition of depth and perspective changes as you zoom in or out, just as it would if you changed standard lenses; photographers are just beginning to realize this in terms of their own pictures.

Mirror "lenses," those reflecting optical systems that achieve long focal lengths without conventional lens elements, have gotten smaller, lighter weight, and three times greater in number. They too are tripod lenses for the most part.

In 1965 only one perspective-control lens was available, the 35-mm f/3.5 PC

Nikkor. In 1975 there are five, with a sixth to be introduced during the year. The shifting front element of these lenses brings to the 35-mm camera what a rising, falling, shifting lens provides on a view camera: the ability to change the position of the subject on the film without moving the camera. Because in most cases the lenses rotate in their mounts, the shift can be made up or down, side to side, or at any in-between angle. (If we could just solve the problem of adjusting SLR viewing and focusing to accommodate it, a 35-mm camera with a tilting back would be fairly

35-mm Camera Models

1965	
AGFA	RF: Optima I A; II S; 500 S Non-RF: Selecta; Selecta M; Optima Reflex Half-frame: Parat I; Paramat SLR: Agfallex IV; V; Selecta-Flex I; II
ALPA	SLR Model: 4b; 5b; 6b; 6c; 8b; 9d; 9f; all also in half-frame models
ANSCO	RF: Anscoset II; Autoset Half-frame: Memo II
ARGUS	RF: Autronic II; Standard C-3; Matchmatic C-3 Non-RF: Automatic 35 SLR: Argus SLR
ASTRA	SLR: 35 F-X; Astraflex 1000; Model LM; Auto 35
AUTO TARON BALDA	RF: Model 35 RF: Super Baldamat I Automatic; Baldessamat RF Non-RF: Baldessa F; Baldessamat F
BEAU BEAUTY-LITE BEIRETTE	RF: Auto-Terra RF: Model III
BELL & HOWELL BESELER	Non-RF: Beirette 35-mm See CANON
CALYPSO CERTO	See TOPCON Non-RF: Amphibious RF: Super Dollina II
COLORA; CONTESSA; CONTESSAMAT; CONTINA; CONTAFLEX; CONTAREX	See Zeiss
DOLPHIN	SLR: N-35 (incorporating Nikkorex-35)
EDINEX	RF: Model III-S Non-RF: Synchro
EDIAX	SLR: Electronica; Edixamat
EXA	Non-RF: Model IA SLR: Model IB; II; IIA; Automatic IA
EXAKTA FUJI	SLR: Automatic VX IIB RF: Auto-M; 35 EE Half-frame: 'Half' SLR: Fujicarex
GAMMA HALINA HAMANO HONEYWELL KALIMAR	RF: Gamma 35-mm Non-RF: Model 35X Non-RF: 35-II See PENTAX Non-RF: Model A; AM; C-64
KODAK	RF: Retina Automatic III Non-RF: Automatic 35F; Motormatic 35F; Retinette 1A SLR: Retina Reflex III f/2.8; III f/1.9; IV
KONICA	RF: EEmatic; Auto S SLR: Model FP
KOWA LEICA MAMIYA MARK MINOLTA	SLR: Model H; SE RF: M-1; M-2S; M-3 SLR: Junior; Model SLR RF: Model S-2 RF: Model A5; AL; Hi-matic 7 Half-frame: Reporter SLR: Model ER; SR-1; SR-7 (A)
MIRANDA	SLR: Automex II; Model DR; F
NIKKOREX	SLR: Auto-35; 35 Zoom; Model F
NIKON NIKONOS	SLR: Model F Non-RF: All Weather '35'
OLYMPUS	Half-frame: Pen; Pen D; Pen EE; Pen EES; Pen F; Pen S
PENTAX PENTINA PETRI FLEX	SLR: H1A; H3v RF: Pentina 35-mm SLR: Model V

PRAKTI PRAKTICA PRAKTINA REGULA

RICOH

ROBOT

ROCCA TARON

TESSINA TOPCON TOWER

VOIGTLANDER

WERRA

YASHICA

ZEISS IKON

1970

AGFA-GEVAERT

ALPA

AMICA ASTRA

AUTO TERRA BELL & HOWELL

BESELER CANON

CAVALIER CERTO

CONTAFLEX CONTAREX EDIXA

EXA

EXAKTA

FUJICA

GM HANIMEX PRAKTICA HONEYWELL

Non-RF: Prakti	Non-RF: Prakti
Non-RF: FX2; FX3	Non-RF: FX2; FX3
Non-RF: Sprint; Sprintomatic; Sprinty	Non-RF: Sprint; Sprintomatic; Sprinty
RF: Auto 35L; 35S; Ricohmatic 35	RF: Auto 35L; 35S; Ricohmatic 35
Non-RF: Auto Shot; Auto 35	Non-RF: Auto Shot; Auto 35
SLR: Singlex; 35 Flex	SLR: Singlex; 35 Flex
RF: Royal 24S; 36S; 18S	RF: Royal 24S; 36S; 18S
Non-RF: Recorder 18; 24; 36; 24e; 36e; Star II/18	Non-RF: Recorder 18; 24; 36; 24e; 36e; Star II/18
RF: SLK	RF: SLK
RF: Auto EE; Auto JE; Model JL; Marquis; Vic	RF: Auto EE; Auto JE; Model JL; Marquis; Vic
Non-RF: Tessina	Non-RF: Tessina
SLR: Super D	SLR: Super D
RF: Model 10B; 18B; 20B; 41	RF: Model 10B; 18B; 20B; 41
Non-RF: Model 39	Non-RF: Model 39
SLR: Model 32B; 37A	SLR: Model 32B; 37A
RF: Vito Automatic R; Vito CLR Deluxe; Vitomatic 11A; Vitoret R	RF: Vito Automatic R; Vito CLR Deluxe; Vitomatic 11A; Vitoret R
Non-RF: Vito Automatic I; Vito C; Vito CL; Vitomatic 1A; Vitoret; Vitoret F; Vitrona	Non-RF: Vito Automatic I; Vito C; Vito CL; Vitomatic 1A; Vitoret; Vitoret F; Vitrona
SLR: Bessamatic Deluxe; Ultramatic	SLR: Bessamatic Deluxe; Ultramatic
RF: Werramat; Werramatic	RF: Werramat; Werramatic
Non-RF: Werra Model I	Non-RF: Werra Model I
RF: Model EE; Lynx-5000; Mini-matic C; Minister D; Minister II	RF: Model EE; Lynx-5000; Mini-matic C; Minister D; Minister II
Non-RF: Flash-O-Set II; YJ	Non-RF: Flash-O-Set II; YJ
Half-frame: Mimy; Model 72E	Half-frame: Mimy; Model 72E
SLR: Penta J; Model J-3; Model J-5	SLR: Penta J; Model J-3; Model J-5
RF: Contessa LKE; Contessamat SBE; SE	RF: Contessa LKE; Contessamat SBE; SE
Non-RF: Colora; Contessa LK; Contessamat; Contina; Contina L; LK	Non-RF: Colora; Contessa LK; Contessamat; Contina; Contina L; LK
SLR: Contaflex Prima; Contaflex Super B; Contarex	SLR: Contaflex Prima; Contaflex Super B; Contarex

ICAREX	SLR: Model 35; 35CS; 35 S
KALIMAR	Non-RF: Model A; Model AM
KODAK KONICA	Non-RF: Retina S1 RF: Auto-SE; Auto-S1.6; Auto-S2 (IGL); C-35; EE-Matic Deluxe (IGL); EE-Matic Deluxe F
	Half-frame: Eye-2 SLR: Auto Reflex; Autoreflex-A; -T; -W
KOWA LEICA	SLR: Model SET; SETR RF: M4 SLR: Leicaflex SL
MAMIYA/SEKOR	SLR: 528 TL; 1000DTL; Pro 1000DTL 1.4
MEOPTA MINOLTA	Non-RF: Flexaret VII RF: Model AL-F; Hi-Matic 7S; Hi-Matic 9
	SLR: SR-1s; SR-T 101; SR-M
MIRANDA	SLR: Sensomat; Motorized Sensomat; Sensorex
NIKKORMAT	SLR: Model FS; FTN
NIKON	SLR: Model F; Photomic FTN
NIKONOS II	Non-RF: All Weather '35'; Amphibious
OLYMPUS	RF: 35 SP; Non-RF: Trip 35 Half-frame: Pen-EE; Pen EES-2; Pen EE-2; Pen FT; FV; FT Pro
PENTAX	SLR: Model H1A; SL; Spotmatic; Motor Drive Spotmatic
PENTINA PETRI	SLR: Pentina 35 RF: Racer 2.8; Racer 1.8; 7S 2.8; 7S
	SLR: FT 1.8; FT 1.4; FT EE
PRAKTI PRAKTICA	Non-RF: Prakti 35 See HANIMEX PRAKTICA
PRAKTINA	SLR: Model FX; Model IIA
REXAMATIC RICOH	RF: Model EL II SLR: Singlex TLS No. 511; No. 512
ROBOT	RF: Royal 24; Royal 36 Non-RF: Motor Recorder-18B; -24B; -36B; -188E; -24BE; -36BE; Star II/25; Star II/50
ROLLEI SUNSCOPE TARON TESSINA	Non-RF: Rollei 35 Non-RF: Sunscope 35 RF: Auto EE; Auto SE Non-RF: Tessina 35; 35-L; 35-L Noiseless
TOPCON	SLR: Auto 100; Super D; Model D-1
VICEROY	RF: Auto 35; Auto 300; Electronic 1000
VOIGTLANDER WERRA	See ZEISS RF: Werramat; Werramatic
YASHICA	RF: Electro-35; Electro-35 GT; Lynx 14 E; Lynx 5000-E; Minister D; Minister III Non-RF: Model YJ SLR: Model TL; TL-Super; TL-Electro X RF: Vitessa 1000 SR Non-RF: Vitessa-500 AE; -500 SE; -500 S
ZEISS IKON-VOIGTLANDER	SLR: Contaflex Super BC; Contarex P; Contarex Super; Contarex Super Electronic

1975

ALPA

ARGUS BEIRETTE CANON

CERTO EDIXA EXA EXAKTA

SLR: Model 10d; 10f; 11e; 11e1; 11e2; 11f; all also in half-frame models	SLR: Model 10d; 10f; 11e; 11e1; 11e2; 11f; all also in half-frame models
SLR: Model STL 1000	SLR: Model STL 1000
Non-RF: Beirette	Non-RF: Beirette
RF: G-111 17; Canon-date E; Canonet 28	RF: G-111 17; Canon-date E; Canonet 28
SLR: Model EF; EX Auto; F-1; FTb; TLb	SLR: Model EF; EX Auto; F-1; FTb; TLb
Non-RF: Model KN 35	Non-RF: Model KN 35
SLR: Edixaflex	SLR: Edixaflex
Non-RF: Model Ia	Non-RF: Model Ia
SLR: VX 500; RTL 1000; VXTL 1000	SLR: VX 500; RTL 1000; VXTL 1000

FUJICA	RF: Model GER Non-RF: Model GE SLR: ST-701; ST-801; ST-901
GAF	RF: Memo 35 EE SLR: Model L-CM; L-CS; L-17
HANIMEX	Non-RF: Hanimex Compact A
PRAKTICA	SLR: IPraktical Nova 18 Model L; LB; LLC; LTL; TL
HONEYWELL KALIMAR/REGULA	See PENTAX Non-RF: Picca C; CB; CLK; Picca MAT SLR: (Regular) Reflex K-650; 2000 CTL; SR-200; SR-100
KONICA	RF: Auto-S2 (IGL); Auto S3; 35 Automatic Non-RF: Model C 35 V SLR: Autoreflex T-3; Autoreflex A-1000
LEICA	RF: Leica CL; M5 SLR: Leicaflex SL
MAMIYA/SEKOR	SLR: Auto XTL; 528 TL; 1000DTL; 500 DTL; Pro 1000DTL 1.4; DSX 1000; DSX 500; MSX 500
MINOLTA	RF: Hi-Matic E; Hi-Matic F SLR: SR-T 100; SR-T 101; SR-T102; XK
MIRANDA	RF: Sensorex SLR: Auto Sensorex EE; Sensorex II
NIKKORMAT NIKON	SLR: Model EL; FTN SLR: Model F; F2; F2S Photomic; Photomic FTN
NIKONOS II	Non-RF: All Weather '35'
OLYMPUS	RF: Model 35 RC; 35 ECR; 35 SPn Non-RF: Model 35 EC2 Half-frame: Pen EE-2; Pen EES-2
PETRI	SLR: Model OM-1 Non-RF: Color 35 SLR: FT II 1.8; FT II 1.4; FT EE
PRAKTI PRAKTICA	Non-RF: Prakti 35 See HANIMEX PRAKTICA
PRAKTINA	SLR: Model FX; Model IIA
REGULA	Non-RF: Sprinty-C 300 Also see KALIMAR/REGULA
RICOH	RF: 500G; 800 EES SLR: Auto TLS EE; Singlex TLS; TLS 401
ROBOT	RF: Royal 24; Royal 36 Non-RF: Motor Recorder-18BS; -18BS; -24b; -36B; Star 25; Star 50; Star 90
ROLLEI	Non-RF: Rollei 35 SLR: Rolleiflex 35
SPIRAFLEX TOPCON	SLR: Model TTL SLR: IC-1 Auto; Super DM
VIVITAR	SLR: 420/SL; 450/SLD; 650/SLX
WERRA	RF: Werramat; Werramatic
YASHICA	RF: Electro 35-CC; -GSN; -GTN; -GL; -FC Non-RF: Electro 35-MC; Model 35-ME SLR: Electro AX; TL-Electro; TL Electro X; TL Electro X ITS
ZEISS IKON	SLR: SL 706; Icarex 35 S-TM; Contarex Super; Contarex Super Electronic SLR: Zenit-E; Zenit-B RF: Model IV
ZENIT ZORKI	

35-mm Films

35-MM BLACK-AND-WHITE FILMS

		1965	1970	1975			1965	1970	1975
ADOX	KB14	x	x			Ansochrome T/100 Tungsten	x		
	KB17	x	x		FUJI	Fujichrome R-100			x
	KB21	x	x		GAF	GAF Ansochrome D/64		x	
AGFA	Isopan IFF	x	x			GAF Ansochrome T/100		x	
	Isopan IF	x				GAF Ansochrome 200 Daylight		x	
	Isopan-Ultra	x	x			GAF Ansochrome 500 Daylight		x	
	Isopan Record	x	x			GAF 64 Daylight			x
ANSCO	Super Hypan	x				GAF 200 Daylight			x
			See GAF			GAF 500 Daylight			x
	Versapan	x			KODAK	Ektachrome Type B	x		
ATLAS	35-mm	x				Ektachrome-X Daylight	x	x	x
FUJI	Neopan SSS			x		High Speed Ektachrome Daylight	x	x	x
GAF	Super Hypan		x			High Speed Ektachrome, Type B	x	x	
	Versapan		x			High Speed Ektachrome Tungsten			x
	GAF 125			x		Kodachrome II Daylight	x	x	
	GAF 250 Type 2881			x		Kodachrome II Professional			
H & W	VTE Pan			x		Type A	x	x	x
	VTE Ultra Pan			x		Kodachrome-X Daylight		x	
ILFORD	Pan F	x	x	x		Kodachrome 25 Daylight			x
	FP3	x				Kodachrome 64 Daylight			x
	HP3	x			PERFECT	35 High Speed	x		
	HPS	x			PERUTZ	Peruchrome	x		
	FP4		x	x	SAKURA	Sakurachrome R-100			x
	HP4		x	x	SEARS	7260, 7261 Daylight	x		
KODAK	Panatomic-X	x	x	x	TECHNICOLOR		x		
	Plus-X Pan	x	x	x	3M CORP	Dynachrome Daylight Type	x		
	Plus-X Portrait	x	x	x		Dynachrome 25	x	x	
	Tri-X	x	x	x		Dynachrome 64		x	
	Infrared	x	x			3M Color Slide 64			x
	High Speed Infrared	x	x	x		3M Color Slide 100			x
	High-Contrast Copy	x	x	x					
	Direct Positive	x	x	x					
	Fine Grain Positive	x	x						
	2475 Recording Film			x	AGFA	Agfacolor CN17	x		
SEARS	7125, -26, -27; 7108	x				Agfacolor CNS		x	x
SUPREME	Var-I-Pan	x			FUJI	Fujicolor			x
	Imperiale "S" Pan		x	x	GAF	GAF Color Print Film		x	x
					KODAK	Ektacolor Roll (100-ft)	x		

35-MM COLOR TRANSPARENCY FILMS

		1965	1970	1975			1965	1970	1975
AGFA	Agfachrome CT18	x	x	x		Kodacolor	x		
	Agfachrome CK20		x			Kodacolor-X	x	x	x
	Agfachrome 64			x		Kodacolor II			x
ANSCO	Ansochrome 100 Daylight	x			SAKURA	Sakuracolor			x
			See GAF		3M CORP	Dynachrome for Color Prints		x	
						3M Color Print Film			x

35-MM COLOR NEGATIVE FILMS

		1965	1970	1975
	Agfacolor CN17	x		
	Agfacolor CNS		x	x
	Fujicolor			x
	GAF Color Print Film		x	x
	Ektacolor Roll (100-ft)	x		
	Ektacolor Professional			
	Type A		x	
	Kodacolor	x		
	Kodacolor-X	x	x	x
	Kodacolor II			x
	Sakuracolor			x
	Dynachrome for Color Prints		x	
	3M Color Print Film			x

35 IN 10 *continued*

easy to design. Coupled with a perspective-control lens, it could rapidly turn the view camera into a relic—God forbid!

We must mention one lens here that is so new, it is not in the 1975 DIRECTORY, the 24-mm f./2.8 VFC Rokkor, shown for the first time by Minolta at the 1974 photokina. This lens has variable field curvature: turn a collar on the lens and you can bend the depth of field to curve it toward or away from the camera!

Macro-focusing lenses have multiplied, too. But what we need are more standard focal lengths that focus continually into the macro range (12 inches and closer) without having to stop to fiddle with notches, latches, and

telescoping lens barrels, or to insert an extension tube or ring between the lens and the camera. I for one have been very unhappy about the disappearance of the Steinheil Macro-Quinaron, -Quinon, -Quinar, and -Tele-Quinar lenses (35-, 50-, 100-, and 135-mm), which let me focus from infinity all the way into the macro range without having to take my eye from the viewfinder.

As for genuine macro lenses, intended for use on bellows or extension tubes, their quality has improved. Given the fact that photographers seem to be going macro much less for what-is-it? close-ups of paper clips and cigarette ends, and more for worthwhile-looking-at things, the macro view seems better.

Electronic flash

Turning to portable and on-camera

flash, ten years ago you could choose equally between standard (bulb) and electronic flash units for 35-mm cameras. Today standard flash has left that scene; it concentrates on the smaller formats (126 and 110), Polaroid amateur cameras, and some specialized professional uses. In 35-mm, flash is practically all electronic, and it is very good. Here's what we've gotten along the way.

Physically smaller, lighter-weight units. Greater light output (meaning higher guide numbers and smaller f-stops). Thousands of more flashes per tube. Lower power requirements, for many more flashes per charge. Smaller portable or built-in power sources with higher efficiency and output, and longer

continued on page 110

Gallery 35



Harry M. Walker

The photographs on these two pages are part of a series of 300 taken at the Bethpage Village Historical Restoration on Long Island. Walker was fascinated by "the beauty and strength of the simple shape and deep wood textures of the interiors of the restored buildings." These photographs are from a recent show at the Soho Photo Gallery in New York City. All the photographs were taken by a 35-mm SLR with a 50-mm lens using Imperiale S Pan film rated at 125 in available light.







Warren Thompson

These photographs are part of a series using nude models in natural landscapes and abandoned structures. "I had earlier done exclusive work with nature photography and decided to try to combine the nude form with natural surroundings to make a unique and personal statement that could not be made using an isolated figure. I wanted the nude to become a component part of the environment, the resulting print to say something that neither the nude nor the environment by itself could," Thompson says. All three shots were taken with 35-mm SLR and 24-mm lens on Tri-X. A tripod was used.





Irving Dolin

On a brief visit to Nantucket, Dolin, a New York based free-lancer for almost 20 years, found this chair in front of the window of an old wooden hotel (left). He photographed the scene exactly as it was, the light coming through windows on both sides of a long corridor. He used a 35-mm rangefinder camera with 35-mm lens and Plus-X film rated at 160. Exposure was 1/30 second at f/4. Because of the great difference in exposure of the chair and the scene outside the window, a great deal of careful burning-in was required on the window area when the final print was made. Weird shot of racing driver (right) was made with 35-mm SLR, Tri-X film, 105-mm lens, exposure: 1/125 second at f/4. The subject wears a flame-resistant suit. The photograph was made on assignment for *True* magazine.





Chester Higgins, Jr.

Higgins, a Brooklyn based free-lancer, has photographed extensively in Africa on a Ford Foundation Fellowship. Portrait of the girl (opposite) was taken in a bus station in Tainale, Ghana with 35-mm SLR and 135-mm lens. Film, Tri-X exposed 1/250 at f/11. Boys in surf (top) were photographed on the cape coast also in Ghana.

Same camera, film, but with 28-mm lens. Exposure, 1/1,000 at f/16. A polarizing filter was used.

Moslem woman was photographed in Agadiz, Niger, for *New York Times* piece on the effects of the drought in West Africa. Same camera and film; 200-mm lens, 1/500 second at f/22.





Victor Landweber

The four pictures on these two pages are part of what the photographer refers to as his "Hand Series." All were taken with a 20-mm lens on his 35-mm camera. "All four of the photos relate strongly to:

1. A concern with juxtaposition of forms.
2. A concern with ambiguity of spatial relationships.
3. Egoistical concern with hand as extension of self," Landweber comments.





Perspective/Barr

After a strenuous evening of trick-or-treating, young Grumec Barr flew into his parents' bedroom in Glendale, Ariz., so his father David took his picture by the light of a 500-watt bulb, using a 35-mm SLR and 24-mm wide-angle lens, at 1/60 second, f/2.8, rating his Tri-X at 1,600.

Ardrey Pierce Bounds

Bee on a sunflower was photographed by direct sun backlight, with 35-mm SLR and 55-mm lens, on Agfachrome 50, through skylight filter; exposure automated.

Slide is inverted because the heavy flower hung upside-down.

James N. Church

Vultures posed on tall Mexican cacti for Church, who used a 35-mm SLR, 105-mm lens, at 1/125 sec, f/5.6, Kodachrome II, in late afternoon sun.

Church, a Virginian, studies photography in Santa Barbara, Ca.

James C. Mannino

(Next pages)

In a tour de force of film-speed pushing, Mannino exposed High Speed Ektachrome Type B by stage lighting at E.I. 5,000, then redeveloped to a negative with effective E.I. of 10,000. His subject was a rock concert in Los Angeles; his camera was a 35-mm SLR with 135-mm lens. Exposure, 1/250 sec, f/5.6 through a No. 3 diffusion filter.











Stephen Green-Armytage

The forms of rising and falling water in a fountain are endlessly fascinating. Green-Armytage made all these pictures with a 35-mm SLR, on Kodachrome, with a variety of lens focal lengths and shutter speeds, under bright or late afternoon sun. Specific data (opposite): top left, 200-mm, 1/1,000 sec at f/4; top right, 135-mm, 1/500 sec, f/4; bottom left, 105-mm, 1/15 sec, f/22; bottom right, 180-mm, 1/15 sec, f/22. This page (made from color): 200-mm, 1/1,000 second.





Paul A. Greenberg

Greenberg, a physician by profession, is a self-taught photographer from Dallas, Tex., who has exhibited his work in many local one-man and group shows. Both photographs on these pages were taken on a recent trip to Russia. Saint Basil's Cathedral, Moscow (left) was taken with 35-mm SLR and 105-mm lens, Tri-X rated at 1,200, exposed 1/500 at f/8. A K-2 filter was used. Boy in cap (right) was photographed on visit to a tea farm near Sochi on the Black Sea. The boy was working in the field and was coaxed into posing by an offer of chewing gum. Same camera, lens, film, and filter. Exposure was 1/250 at f/8.





Chris Regas

Amateur photographer

Regas is a district sales manager for a large pharmaceutical firm in Dallas, Tex. and was on the same tour of Russia as Dr. Paul Greenberg whose work also appears here.

Shot of Soviet soldiers (opposite top) was taken in Moscow with a 35-mm SLR and 200-mm lens. Film: Tri-X rated at 1,000, exposure, 1/1,000 at f/16.

In the making of the print, some light bleaching was done on the soldier's face. Sunbathers (opposite bottom) were photographed on a beach near Leningrad. Regas was fascinated by the fact that most Russians sunbathe while standing and that bikini type bathing suits seemed to be standard apparel for all ages.

Same camera and film, but with 135-mm lens.

Exposure, 1/1,000 at f/11. Reactions of passersby to nude male statue at the summer palace near Leningrad were the subject of many shots taken by Regas.

Picture at right was a favorite. Same technical data as for soldier shot.





Max J. A. Fallon

A Spanish farmer with his donkey, a London Bobby guarding an airline office on Regent Street during a bomb scare, and a gondolier in Venice are the subjects for these candid portraits by a San Francisco free-lancer. All were taken with 35-mm SLR with 200-mm lens, Tri-X film.





Francis Laharrague

A Frenchman from Biarritz, Laharrague is presently freelancing in New York City. Laharrague loves to work with children and has recently been published in *Sesame Street* and *Electric Company* magazines. His interest in media productions for children had him working as an assistant cameraman on a French documentary movie for children that was shot in California. The photograph on this page of Brooke Shields was taken with a 35-mm SLR and an 85-mm lens, Plus-X rated at 125. Electronic flash was used in this studio shot. The shutter speed was 1/60 at f/16. The picture on the facing page, also of Brooke, was taken with a 35-mm SLR and a 28-mm lens at a shutter speed of 1/30 at f/5.6.





Erica Lennard

The photographs on these four pages are part of a book in progress entitled "Les Soeurs." Ms. Lennard has been working on it for the past four years and feels "as it changes I grow (mature) as a photographer and a woman." The photograph on this page, entitled "Elizabeth and Tinda," was taken in Hollywood. Ms. Lennard

used a rangefinder camera with a 50-mm lens at a shutter speed of 1/60 in natural light and Tri-X film. The photograph on the facing page, entitled "Elizabeth" (Ms. Lennard's sister), was taken on their first visit to Los Angeles in 1971. Erica used a 35-mm SLR with a 50-mm lens and Tri-X. Shutter speed was 1/30 at f/5.6.

35-MM PHOTOGRAPHY





Erica Lennard

The photographs on these two pages are from a completed limited portfolio entitled "La Sorella," which is available through Lustrum Press. The photograph on this page, entitled "Self-Portrait," was taken in New York City in 1973 just before Ms. Lennard left to live in Paris. She used a rangefinder with a 50-mm lens and in natural light the

shutter speed was 1/60 second at f/5.6. The photograph on the facing page is of Ms. Lennard's sister Elizabeth. The picture was taken in California with a 35-mm SLR and a 50-mm lens at a shutter speed of 1/30 at f/5.6. In addition to living and free-lancing in Paris and vicinity, Ms. Lennard is working on a Grimm's fairy tale photobook, "The Wonderful Travellers," also to be published by Lustrum Press.

35-MM PHOTOGRAPHY





Barry Sonnenfeld

A quiet moment at New York's Guggenheim Museum, a farm in Iowa (one of last where Belgian horses are still raised) and a lonely spot on Nantucket Island in early spring are the subjects of these meticulously composed photographs. All were made with a 35-mm rangefinder. Museum scene and the converging tire tracks were taken on Tri-X rated at 650. The horses were photographed on Panatomic-X rated at 50.







Paul Mitchell

Offbeat portraits of children are a specialty of this Cincinnati, Ohio professional. Some of the photographs on the next four pages were for paid portrait assignments, others are of children Mitchell saw on the street and induced to pose. "Pat and Jack" were photographed with a 35-mm SLR with 105-mm lens. Film was Tri-X exposed at 1/125 at f/5.6. "Rob and Tony" (above) were photographed with same camera, lens, and film. Exposure, 1/250 at f/8.



Paul Mitchell

The two blond children, "Leslie and Arin" (left), were taken for one of Mitchell's formal portrait assignments.

"For a portrait of this sort, I usually shoot three to four rolls of 36-exposure film. Many times the portraits are unsuccessful the first time and have to be retaken. So it was with this photo-attempt number two," he says. Same camera, lens, and film as previous shots. Exposure, 1/125, f/2.5. Portrait of Corry (right) was taken after the photographer saw her running in the yard just before a rainstorm. "Her hair was tossed about and seemed to complement the rainstorm," Mitchell comments, "I asked her to come in and pose for a minute or two. This resulted." Same camera, lens, and film. Exposure: 1/60 second at f/2.5 in window light.





Larry Schermer

The pictures on this page were made by Schermer while on assignment for his college paper—*Minnesota Daily*. The cars were part of the antique Car Club Rally which was held on the university campus. Schermer is presently a student at the University of Minnesota, majoring in photojournalism. The shots were taken with a 35-mm SLR with an 85-mm lens. The Tri-X film was rated at 800 and a skylight filter was used. The shutter speed was 1/500 at f/11.



Alan Magayne-Roshak

While out "looking for pictures," Magayne-Roshak was "attracted to the geometry of the scene" in the top picture, and waited until some people chanced to walk by. The photographer, a graduate of University of Wisconsin at Milwaukee, is presently associated with the University's Photographic Services. A 35-mm SLR was used with a 135-mm lens. Film was Panatomic-X. The shutter speed was 1/250 at f/5.6. In the lower photograph, Magayne-Roshak was inside the inflated sculpture at 1970 Lakefront Festival of the Arts in Milwaukee. The diffused sunlight coming through the plastic allowed him to shoot at 1/60 and f/8 with a 35-mm SLR and 50-mm lens. He used Plus-X film.





James Byrne

"Dissonance," the top picture, was photographed by Byrne while on a free-lance commercial assignment. It was taken in the Walker Art center in Minneapolis, where Byrne lives. He used a 35-mm SLR with an 85-mm lens. Stage lighting from above allowed Byrne to use a shutter speed of 1/60 with an aperture of f/2.8. The lower photograph was taken on assignment for the *Minnesota Daily* (Byrne was a staff photographer). The subject is film director Marcel Ophuls ("The Sorrow and the Pity") who was visiting in Minneapolis. Byrne is presently involved with "video as art and exhibiting (it) nationwide."



Patrick Kelly

During a visit to New York City, Kelly was waiting on the pier for the ferry to the Statue of Liberty.

He glanced at the reflection in the restaurant window and prepared to photograph it. As he was about to shoot, the waitress raised her hands to cover face, causing the ghost-like hands to appear above the water reflection."

Kelly used a 35-mm camera with a 50-mm lens, a shutter speed of 1/125 at f/4 and an ultraviolet filter.







Scott Schneider

While working on a feature story about glass blowing for the University of Minnesota's newspaper—*Minnesota Daily*—Schneider found Sarah Huss in the doorway of the studio. He used a 35-mm SLR with a 35-mm lens, at 1/250 of a second at f/5.6 The photograph above was taken in a

high school in Minneapolis. The Old North High School was about to be torn down and Schneider's father wanted to be photographed in his school of 20 years. Schneider used a 35-mm SLR with a 24-mm lens, at 1/15 second hand held at f/4.



Anna Pomaska

The sudden clouding over of a sunny day inspired Anna Pomaska to take this moody portrait of her husband reflected in the roof of their car. She used an SLR with 55-mm lens. Film was Tri-X. Exposure data not available.

"Lots of people can't speak up for themselves, and they should," Miss Krementz says. "I am known as a tough negotiator because I believe in protecting the photographer's rights. I am meticulous besides being well organized. I arrive when I say I will. And I deliver when I say I will."

"I think discipline is very important, and I think this is one thing young people tend to overlook today. Beginners often come and want to work for me, and they don't even bring a neat portfolio or show up on time. Most young photographers' motives aren't very pure. They just want to go where everyone else goes. They don't seem to want to work. They just want it to happen. They don't even know about doing their homework."

"Homework has always been a huge part of my background," Miss Krementz says. "Before I photograph an author I always try to find out everything I can about him. I love to read, so I usually know the books and I try to find out what the author is interested in. This helps me to work quickly and not use up a busy person's valuable time."

"For instance, I knew John D. MacDonald had written lots of mysteries, and so I got the idea of surrounding him on the floor with rows and rows of his books. It made a different kind of picture than just a head and shoulders portrait, and it conveys exactly what he's done in one glance. I knew S.J. Perelman traveled the world so I photographed him sitting on his trunk."

"On the other hand, you might get a lead on doing a characteristic picture just by talking to an author as you work. I took a lot of pictures of Katherine Anne Porter all dressed up for the occasion, and they were very nice, but not terribly unusual. Then she took me around her house, and I saw her rumpled bed." "Miss Krementz imitated Miss Porter's southern drawl, 'That's where I spend all my time, Honey. I just put on the dress for the pictures.' So I got the idea to photograph her in bed, and of course it's a much better picture."

"If you do what you like to do," Miss Krementz says, "people like having you around. They respond to you and you can get better pictures. I like everything I do. I love writers. I love meeting them, and I love reading them. Actually I shoot for myself, period. If magazines want to use my pictures that's O.K."

Even though she feels she shoots strictly for herself, Miss Krementz is subject to the same disappointment pangs

as any other photographer. "When you get a bad call, sure you're disappointed," she says. "They're not all home runs. Sometimes I'm beaten by a better picture, sometimes not. Actually it's hard to hang in day after day, year after year. One of the pitfalls of success is that once you're up you have to be really committed to what you're doing to survive the heartbreaks and the failures."

"One of the things I like to do, especially when I feel down, is to go to museums and look at paintings. It gives me a lot of help in my photography. Especially for lighting. I like to study the Vermeers. And Rembrandt and Reynolds and Renoir. You can learn a lot that way, even from books if you don't have museums."

"I do all natural-light work, except for occasional indoor jobs that are just too dark. Then I use a little lighting kit that some people over at Time Inc. helped me put together."

Miss Krementz travels and works very sparingly on the equipment end. Her gear is deceptively simple and always packed ready to go. She does not use a regular camera case. Instead she has a well-worn sort of canvas shoulder bag containing her cameras, lenses, and film. She has pared her equipment down to two cameras and three lenses.

Currently she uses one single-lens reflex with an 85-mm f/1.8 lens primarily for portraits. She also has a 55-mm macro for added flexibility. For her reportage work she carries a rangefinder camera with a 35-mm f/2 lens. She has used the rangefinder for so long that the metal is worn to a shine like the seat of serge pants.

The cameras with neck straps are dumped loose and ready to go in the bag, which is stuffed with film containers. She protects the lens surface with screw-on haze filters.

That's the sum total of camera equipment Miss Krementz used for all of the 65 outstanding portraits in her Nikon House show, and the hundreds and hundreds of other pictures that race in and out of her files.

Her lighting kit is even simpler. Another small, lightweight cloth bag with a handful of light clips, some regular and some blue floodlight bulbs, and two featherweight little bowl reflectors. The whole lighting kit weighs a monumental two pounds, but she feels it does what she wants.

Her film is primarily Kodak Tri-X, since the majority of her work is black-and-white. When the job calls for color she shoots High Speed Ektachrome Daylight or Type B. She feels most at home in

black-and-white, however. "For me, shooting black-and-white is like speaking English," Miss Krementz says. "Color is like speaking French."

From years of work she feels she has developed a sixth sense about light and exposure, and says that she never uses a meter. She will pick up a proof sheet at random to point out how uniform the exposures are. And they are.

Now a beautiful young woman of 34 (lovelier than her "official" photograph might suggest), Miss Krementz has had a long love affair with New York and a driving determination to succeed there. Ever since she was a little girl growing up in Morristown, N.J., New York was her dream city. It was the magical place she visited for birthdays and special occasions. It had such glamorous treats as the Automat for lunch, and art museums, and theaters. She still remembers fondly the excitement of the play *Peter Pan* when she joined all the kids in the audience yelling "Yes!" to the magic question "Do you believe?" She remembers *The King and I* and all the other glittering thrills of New York, and determined that one day she would be part of it too.

After boarding school at the Masters School in Dobbs Ferry, N.Y., and a year majoring in art at Drew University, Miss Krementz picked herself up and made a beeline for New York in 1959.

"My primary motive in coming to New York was to be self-supporting," she says, and her first job was as a secretary at *Harper's Bazaar*, followed up by a stint at *Glamour*. Photography was not yet on her horizon but "important people" were, and "knowing people" has come to be an important part of the Krementz mix.

By 1961 she and a young friend had each saved \$1,000, and as the story goes, Miss Krementz swapped her sewing machine for a Kodak zone-focus camera and set off with her friend for a year of world travel. Such were her humble photographic beginnings.

In 1962 she went to work for the now-defunct *Show* magazine, where her pictures caught the eye of a co-worker who suggested that she really ought to be a photographer. Next thing we know, Miss Krementz got herself hired as the first woman photographer on the now-defunct *N.Y. Herald Tribune*. At the *Trib* she got the kind of deadline discipline and skill of producing under pressure that so many young people miss. She even got a taste of darkroom work, although it has never interested her seriously.

At the *Herald-Tribune* Miss Krementz



THINK SMALL

How to photograph coins
and urns and other trinkets
smaller than a bread box

BY ARNOLD SHERMANN

Photographing objects smaller than the proverbial bread box need not be a project involving complex professional photographic equipment and lighting or calculus calculations. It can be done easily on a table with minimum equipment.

Some ideal lighting assistants are (my favorites): a couple of photofloods, photolamps with a spun aluminum reflector, desk lamp with an articulated arm, high-intensity lamp, and an Aristo DA-10 light box. The latter serves to give shadowless lighting on the interior thanks to a fluorescent lamp that encircles its entire white insides. It's ideal for photographing such subjects as insects, stamps, and other objects for which flat, even lighting is essential. It's also recommended for situations where an illuminated background is needed, since it can be turned over and the bottom, a translucent panel, used for lighting from underneath.

For me, nothing can beat a through-the-lens-metering single-lens reflex for close-up work. It virtually eliminates the need for calculating exposures as magnifications increase when using acces-

sories such as a bellows or macro lens. However, if you don't have such a camera and must rely on formulas, there are several good sources for them including publishers such as Amphoto, East Gate and Zeckendorf Blvds., Garden City, N.Y. 11530.

My choice in lenses is a 50-mm macro that will shoot 1:1; for anything larger than life size, I switch to a bellows, but it's not necessary to get that sophisticated. A good set of close-up lenses can do quite well for many subjects; just beware of the more powerful ones, since edge sharpness can deteriorate noticeably. Extension tubes can be used, and, in a pinch, a tele-extender. Some manufacturers offer reverse adapters for their lenses, permitting them to work at very close distances.

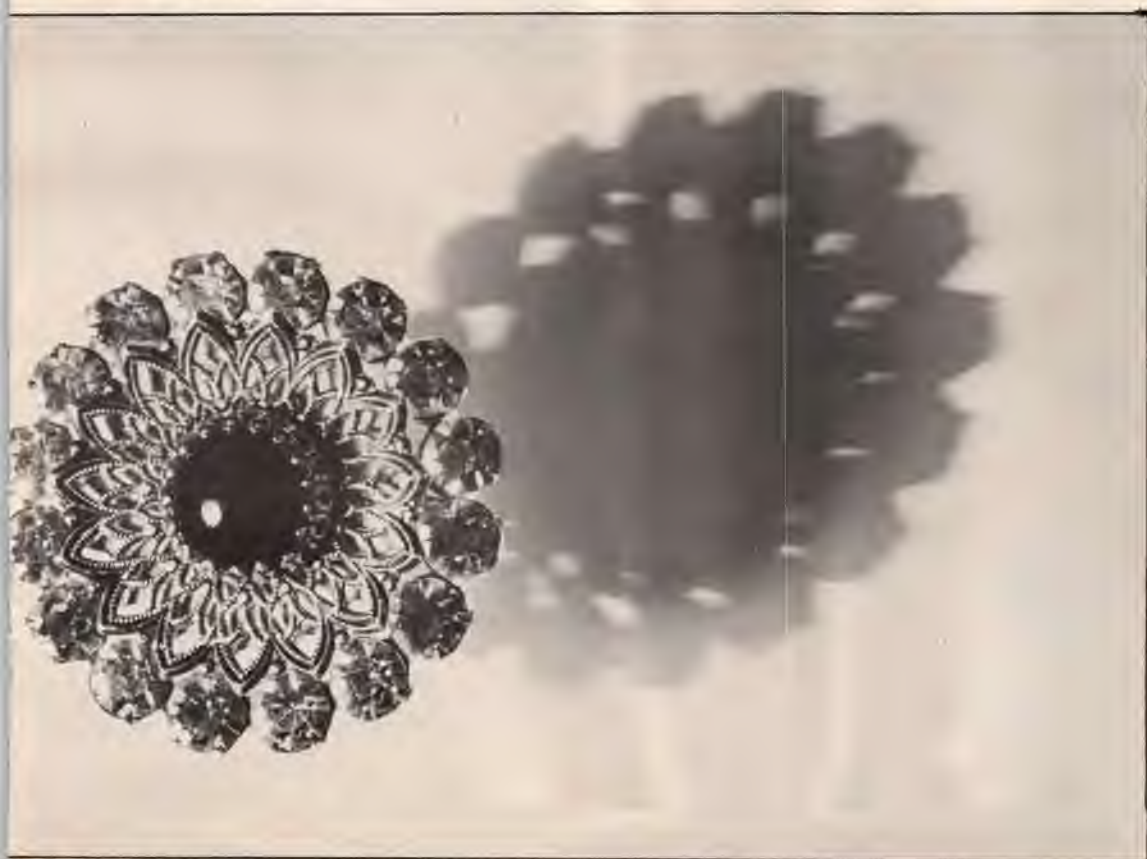
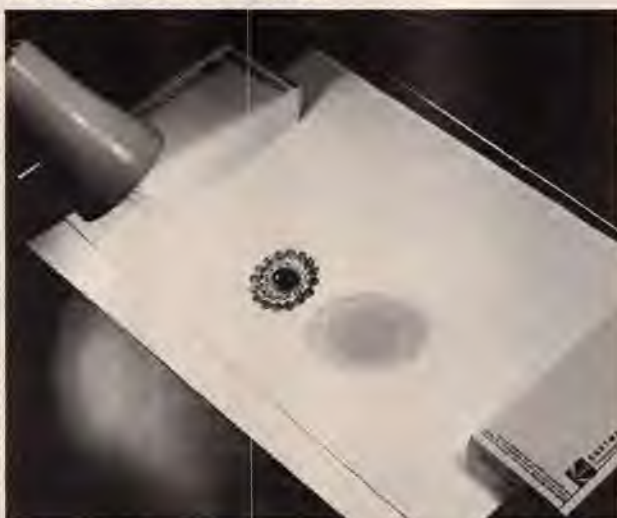
Invaluable as additional aids are: for holding an object in a certain desired position, a lump of clay; for cutting down on reflections, a can of dulling spray; for filling in shadows, a mirror or aluminum foil; and for creating a lighting tent in which to put subjects, heavy translucent papers.





Placing several coins on a sheet of glass over other coins makes them all seem to float. Lighting is from high-intensity lamp, which serves primarily to light coins on under side; desk lamps add front, sidelighting.

Jeweled pin, below, was photographed with same technique as coins at left, except that it created its own background. The nearer a point light source you can approach, the sharper the shadows will be.





Metallic objects present special problems. Urn at top right was photographed with exposure for highlights, then, left for flatter, less contrasty areas. Neither is ideal. In two lower shots, urn has been sprayed with dulling spray. Again, left shot was for flatter areas, right, for the highlights.

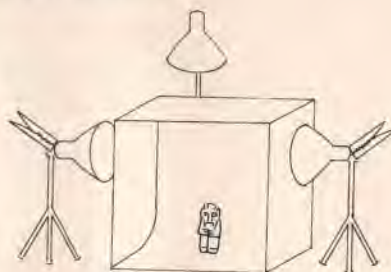


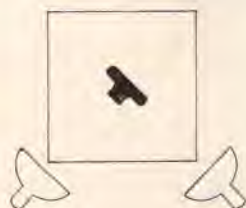
To accentuate carvings of stone figure, sidelighting was used, but opposite side was then in too much shadow. In order to "kick" some light back into that area, a piece of crumpled foil wrapped around a board was used as a reflector (left), giving a great deal of even soft illumination.

A different lighting angle gives another character to the carved stone figure. Here a main light, a 60-watt bulb overhead (not shown) along with the small high-intensity lamp added to give highlights to the smooth, polished stone created the effect shown at right.

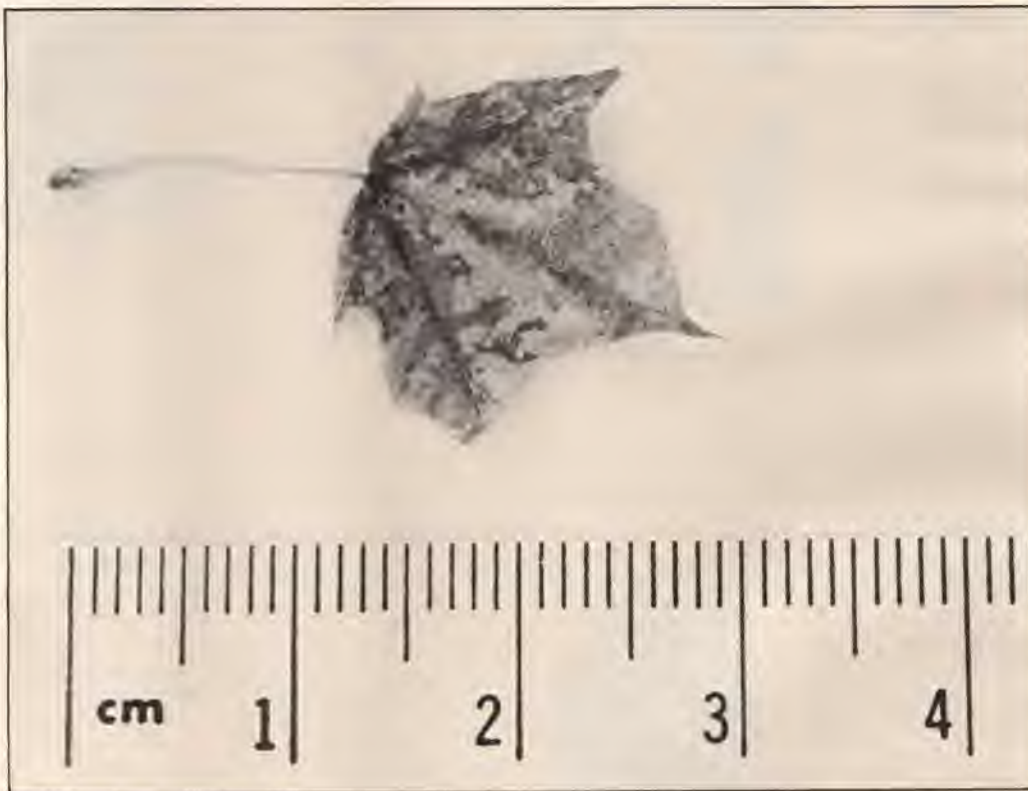


The most "accurate" rendition of the little stone figure would be with flat, diffuse lighting such as that created in the tent in line drawing below. The statue is lighted from outside tent, light shines through paper and is bounced off all the white walls evenly. Almost any type of object photographs well under these conditions.

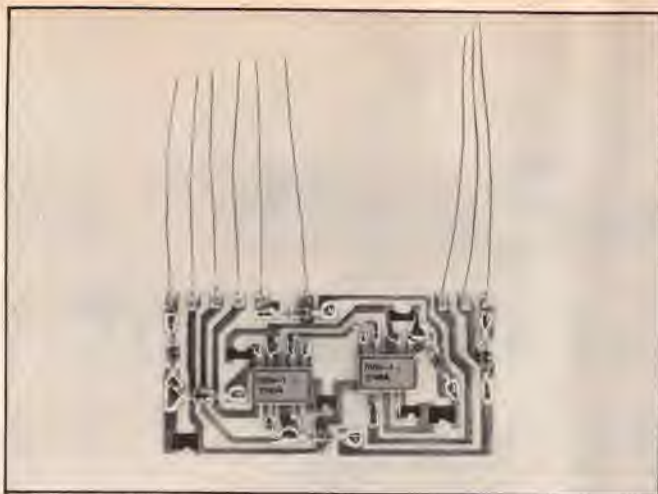




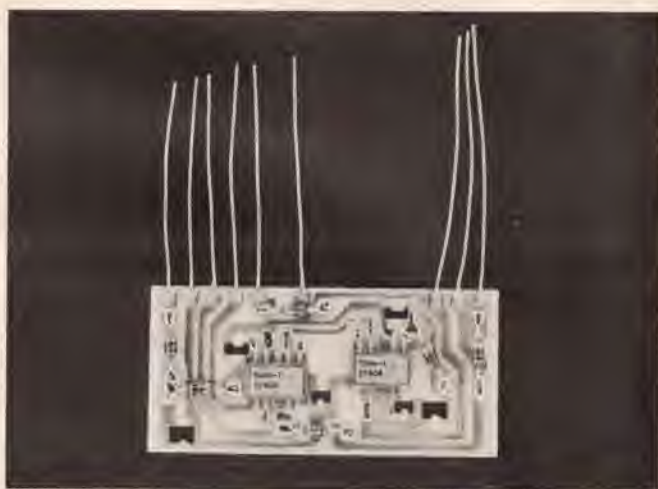
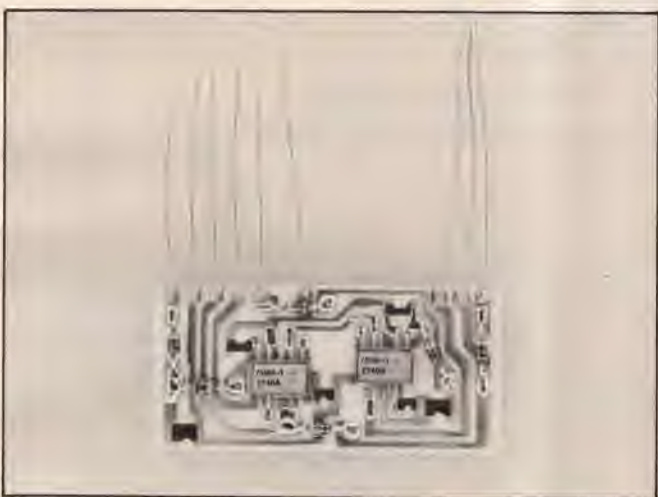
For most equipment photographs, one of the old standbys is two 250-watt photofloods in spun aluminum reflectors at 45-degree angles. This crosslighting technique works quite well on subjects such as cameras, mechanical pieces, and objects that have some depth. By moving in quite close, you can almost eliminate shadows cast by the object itself.



A tent need not be a tent: here a heavy white paper tube glued with white bond (top) serves to diffuse the light on this tiny leaf. When shooting small objects, it's almost a necessity that you give some idea of scale. Would you have guessed that the maple leaf in the shot above was as small as it is without the aid of a ruler?



Attention to small details is essential. Removing small pieces of dust, lint, etc., makes difference between professional-looking result and messy shot such as above. Blower brush is helpful aid here. Below, Aristo DA-10 light box, which creates shadowless lighting on objects placed within it. Bottom, piece of modeling clay is pressed into service as prop to hold up open antique watch having its picture taken.



Does the background make a difference? All three shots above were taken inside Aristo light box. However, in top shot, circuitry was raised off bottom by setting it on paper tube. Light coming through makes metallic parts appear darker. In middle shot, circuitry rests on bottom of light box, illumination is good and even, but detail doesn't stand out well. Bottom, carbon paper serves as background, making emphatic contrast.



What On Earth is an LED and Can it Do Anything For Me?

The latest step in the electronics revolution is the use of light-emitting diodes instead of needles to indicate exposure

BY HAROLD O. MARTIN

Idiot lights for photographers? Never! What never? Well. . .hardly ever.

With profuse apologies to Gilbert and Sullivan, this bit of doggerel represents the not-unexpected reaction of most right-thinking photographic experts when they first encountered the light-emitting diode (LED) in the viewfinder of the Fuji ST 801 some three years ago.

Instead of lining up a needle in the viewfinder to indicate correct exposure, Fuji's new system used a string of seven small lights, lined up in a row, to indicate

underexposure, overexposure, and, of course, on-the-button exposure. This was the first departure from the universal match-needle system, a path that has since been followed by Nikon in their F2S finder, by Miranda in their new dx-3, and by Fuji in their digital-readout Fujica ST-901. And, progress being both painful and inexorable, there is little doubt that within several years, the use of light-emitting diodes instead of needles will be not only accepted, even by right-thinking photographers, but also by

most manufacturers.

The reasons are essentially two. First, the light-emitting diode (LED for short) is a far more robust system, not having any mechanical moving parts. The needle movement is probably the most fragile device now used in photography, consisting of a needle delicately balanced on a jewel-like pivot. Secondly, the LED system permits exposure readings under much lower light levels since there is no needle to illuminate. Instead, the exposure indicator itself is illuminated.

Actually, the LED represents a logical development of an electronics revolution that has been going on in photography for about the past 20 years, ever since the first cadmium-sulfide meters made their appearance. As electronic devices became more compact and reliable, particularly with the growth of solid state circuitry, the suitability for control circuits in such confined areas as cameras grew. Until the use of LEDs, no purely electronic device was available: at some point, the electronic sensing equipment was coupled to mechanical control equipment. The point of coupling—the pivoting needle—represented a potential weakness in the whole system. Today, the end of this weakness is at hand.

But before hailing the future, it might be interesting to look into the past to see how we arrived at the present.

In man's eternal quest for easier, more efficient, and more convenient ways of taking pictures, one of the most persistent problems was correct exposure. And one of the first attempts to solve this problem was the use of the



Fujica ST 801 ushered in the LED revolution, being the first camera to use a series of light-emitting diodes instead of a needle to indicate correct exposure. The array consisted of seven lights, described in detail on the next page.

actinometer, a device about the size and shape of a pocket watch. This device exposed a piece of sensitized paper to light, timed by the photographer, until the paper darkened to reach a standard tint. By feeding the time into the computer dial, the photographer could secure a reasonably accurate exposure guide. Actinometers were used well into the 1920s.

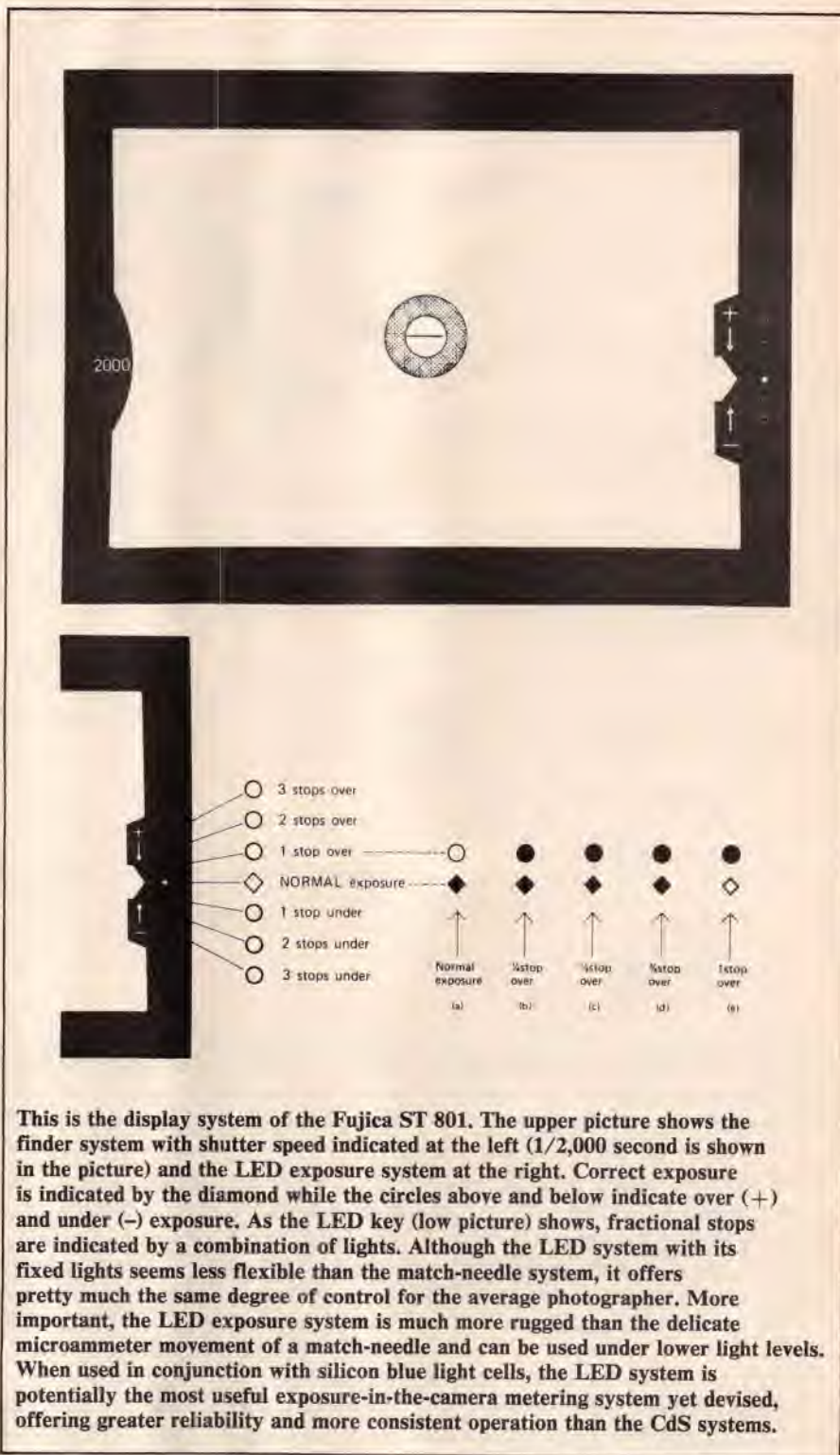
The second step was the use of an *extinction meter*, a device in which a series of numbers was observed until the faintest number could just be seen. This almost-unseen number was then transferred to a calculator dial to get a somewhat more accurate exposure setting. Extinction meters such as the Leudi and Intoscope were used until the early 1940s.

The development of photoelectric cells during the 1920s led to the introduction, about 1933, of the most significant development in exposure control, the photoelectric exposure meter. In this meter, an iron disk is coated with selenium and an extremely thin (actually transparent) layer of gold or platinum placed on top of the selenium. When light passes through the layer of precious metal and hits the selenium, an electric current is generated. This current is used to drive a galvanometer, which is the needle movement of the meter.

The classic type of selenium cell meter is, of course, the Weston. Selenium meters including the current Weston Master VI and the Sekonic Studio, are still in use today by many advanced users. The reasons for their longevity can be found in the advantages they offer. First, selenium cells generate their own current so that there is no need for a battery. Secondly, they are more reliable under conditions of extreme brightness. Third, selenium cell meters react faster to changing light conditions. Finally, they are extremely rugged: short of being dropped or stored in a glove compartment while traveling in Death Valley, selenium cell meters seem to go on forever.

However, selenium meters did have one drawback. They were not sensitive enough for low light. Even with auxiliary booster cells, such as were used on the discontinued General Electric PR-2, selenium meters just couldn't get down to the dim levels preferred by post-war "available light" photographers.

The answer to this problem arrived



This is the display system of the Fujica ST 801. The upper picture shows the finder system with shutter speed indicated at the left (1/2,000 second is shown in the picture) and the LED exposure system at the right. Correct exposure is indicated by the diamond while the circles above and below indicate over (+) and under (-) exposure. As the LED key (low picture) shows, fractional stops are indicated by a combination of lights. Although the LED system with its fixed lights seems less flexible than the match-needle system, it offers pretty much the same degree of control for the average photographer. More important, the LED exposure system is much more rugged than the delicate microammeter movement of a match-needle and can be used under lower light levels. When used in conjunction with silicon blue light cells, the LED system is potentially the most useful exposure-in-the-camera metering system yet devised, offering greater reliability and more consistent operation than the CdS systems.

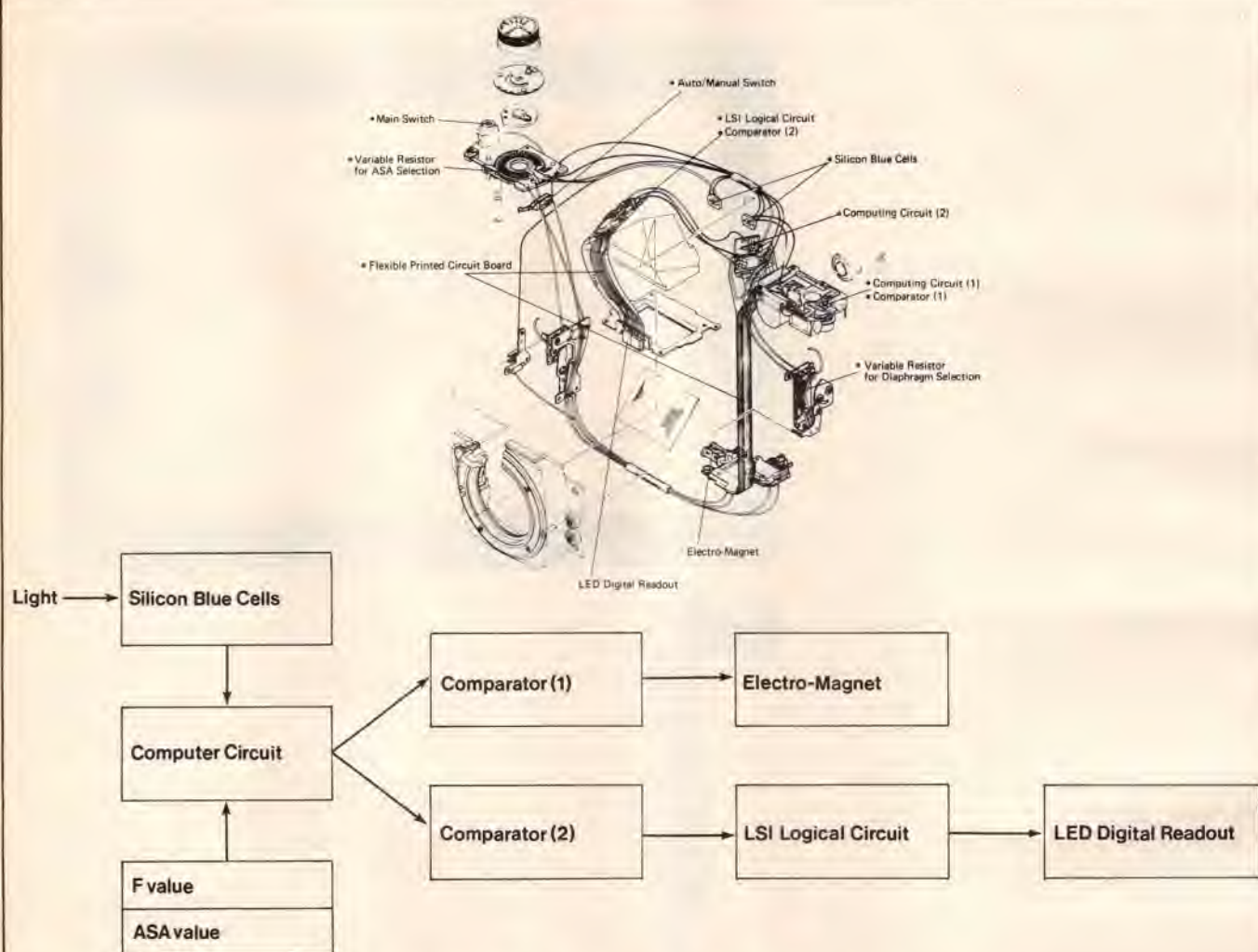


Diagram above shows LED digital readout system used in Fujica ST 901. Circuitry is similar to earlier ST 801, but LED readout displays shutter speeds instead of a series of lights. Because camera is automatic, shutter speed readout covers a range of actual shutter speeds: 1/500 may be actually 1/425 or 1/650 second. Block diagram below shows operational relationship between circuit components to provide correct exposure.

during the early 1960s with the cadmium-sulfide meter. The cadmium-sulfide cell, a product of the post-war electronics revolution, is a solid-state semiconductor, consisting of a ceramic base with suitable leads and a coating of cadmium sulfide.

Semi-conductors—the best known of which are transistors—are materials that are not as conductive as metal nor as non-conductive as insulators. In short, under certain conditions, semi-conductors will allow electric current to pass in *one direction*. (The reasons, having to do with the atomic structure of particular crystalline materials, lie outside of this discussion.)

Unlike the selenium cell, which generates its own power, the cadmium-sulfide

cell is a photo-conductor, a light-sensitive control device. Its resistance to an electrical current is inversely proportional to the light striking the cell: the brighter the light, the lower the resistance and the greater the flow of current. The dimmer the light, the higher the resistance and the lower the flow of current.

The fact that it does not generate electricity gives the cadmium-sulfide cell (CdS) several advantages when used as an exposure meter. First, the cell is much more compact than selenium. Secondly, a CdS cell can respond to a broader range of light intensities, particularly at the low end, providing sensitive, accurate metering simply by regulating a flow of current supplied by an external battery. Finally, the CdS cell could be

used in light as little as the 1/50 to 1/100 needed to move the needle of a selenium cell meter.

Within a relatively few years, the CdS cell has become the dominant form of meter, used both in hand-held models (as in the Gossen Lunasix) and built into cameras (as in the Leica M5, Canons, Nikons, Mirandas, Pentaxes, etc.).

The general arrangement of a CdS meter is to hook up a CdS cell in series with a battery and a microammeter, or needle movement. The CdS cell, sensing the light, serves as a moving valve to control the current from the battery to the needle. With bright light, there is less resistance and more current, giving a higher reading. In dim light, the reverse takes place. In the case of automatic

cameras, the CdS system is used to control either the diaphragm or shutter; however, the principle of using the CdS cell to regulate a flow of current remains the same.

But photography's search for a better light trap was not to be denied. In short, good as CdS cells were, they had certain drawbacks. First, CdS cells have a bad memory, photographically speaking—they do not forget, particularly when exposed to bright light. Secondly, the sensitivity of CdS cells is not quite the same as either the eye or photographic film: CdS cells are most sensitive to green light whereas film tends to respond more strongly to blue light.

The most recent answer to problems of CdS cells is the silicon blue cell. Silicon is one of the most widely used semiconductors and, when used as a light detector, acts as a photoelectric cell. That is, silicon cells generate a minute current, proportional to the amount of light, which is then amplified to activate the metering system. The silicon photocell offers several important advantages over CdS cells: a greater sensitivity to low light levels; a response to light closely corresponding to that of the eye; and an absence of "memory," which provides a faster response to light changes.

In general, a silicon photocell consists of two elements, a base which is p-type (roughly equal to positive in non-solid state electrical terminology) and n-type (or, roughly, negative, in the same non-solid state terms). N-type material is produced by adding minute impurities to silicon to vary its atomic structure. When light hits the material, a current is generated at the p-n junction.

Until now, most of the electronic progress in exposure metering had gone toward developing more sensitive light detectors which were used to control the movement of a small meter, the needle system. This was convenient, accurate, very useful, but very fragile. At this point in time, roughly 1972, we come to the light-emitting diode. The LED made its debut in the Fujica ST 801, the first camera to use diodes instead of a needle to indicate exposure.

The light-emitting diode is essentially a laser, a device that produces light when acted upon by a current. Laser is an acronym for light amplification by stimulated emission of radiation, and is, to some extent, the reverse of a photo-



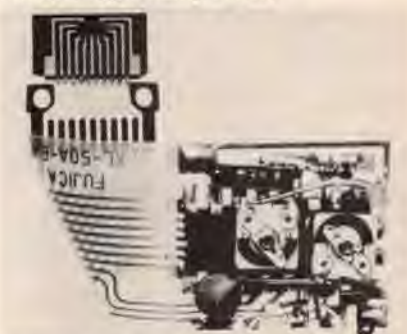
Silicon blue cell is actually a photocell, generating a minute current that is amplified by the battery in the camera.



Circuitry of digital readout system, LEDs are at tips of printed circuit and light up to form digital pattern when current flows, being actually lasers.



Manufacturing techniques permitting the production of microscopic, flexible printed circuits makes modern camera electronics possible.



Flexible LED digital readout circuit is attached to "Large Scale Integrated" circuit board that contains logic circuit. LSI circuit incorporates some 400 elements to control camera.



Light-emitting diodes used in Fujica ST 901 are modern miniature miracles. The development of microminiaturization and integrated circuitry makes possible sophisticated electronics in extremely small package. Apart from savings in space, integrated circuits use very little power, give off almost no heat and can be expected to last almost forever.

cell. If we go back to our silicon cell, we see it as a solid state device with two types of materials, p-type and n-type. When light hits the point where the two materials meet, as we said just a moment ago, a stream of electrons (an electric current) begins to flow.

With the laser diode, or LED, the reverse happens. When a stream of electrons hits the LED, the diode glows instead of generating an electric current. This glow, in turn, stimulates additional light emission, resulting in a very bright, clear, concentrated beam.

Thus, the sequence of events in an LED exposure system is as follows: light hits the photocells, which generate a minute current proportional to the amount of light. This current is amplified in a field-effect transistor (FET) circuit drawing upon a battery for additional voltage. This amplified voltage in turn is fed to a series of laser diodes (LEDs), causing them to glow in response to the stimulation, indicating the exposure information being fed into the camera's control system.

The display varies, of course, with the camera model. In the first LED camera, the Fujica ST-801, a series of seven lights were displayed in the viewfinder, six circles and a diamond in the center. Normal exposure is indicated by the diamond, while under- and overexposure is indicated by the circles above and below the diamond. Each circle represents one stop departure from normal, with combinations of the center diamond and circles to indicate fractional stops less than a full stop from normal.

In the later Fujica ST-901, the readout is digital with full shutter settings (1/60, 1/500, 1/1,000, etc.). But while the digital readouts represent fixed steps, the actual shutter speeds, set automatically, vary within the steps. Thus, a reading of 1/100 second in the finder may represent a range from about 1/90 to 1/150 second depending upon the exact speed required for optimum exposure.

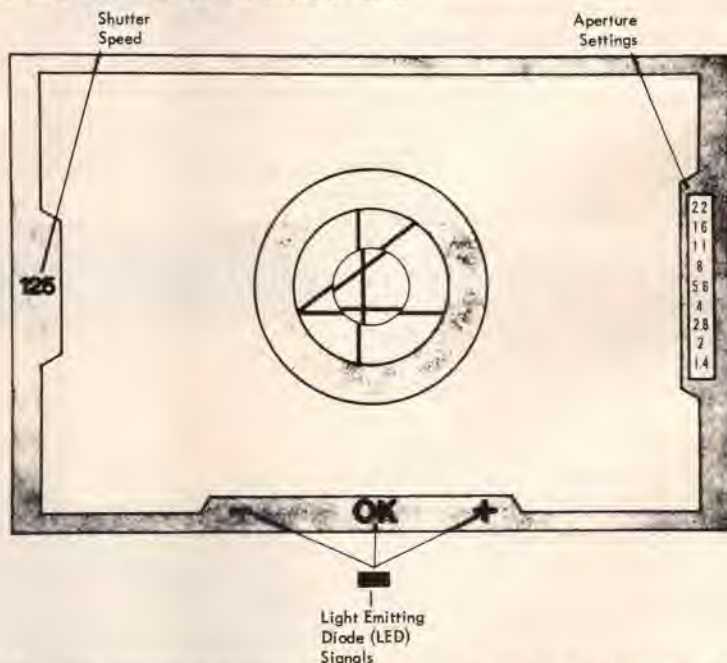
In the Miranda dx-3, the LED signals are a plus and a minus indicator, plus an OK in the center of the lower edge of the viewfinder. Correct exposure is indicated by an "OK" reading, underexposure by minus (-), and overexposure by plus (+). If the batteries in the Miranda fall below the specified 4.5 volts, the LEDs will not light.

One of the most recent cameras to

continued on page 111



Nikon F2S Finder also uses LED readout, in the shape of arrows to indicate over- and underexposure. This finder, part of the Nikon F2 system, provides exposure measurement under lower light levels than standard F2 finder and can be used for automated control.



One of the latest cameras to incorporate LED exposure readout, Miranda dx-3 uses three diodes, one for under, one for overexposure, a third for correct exposure.

IT'S SUPER SHUTTER!

The 1/2,000-second shutter is upon us. Is it a boon or just another burden for the consumer?

BY WALLACE HANSON

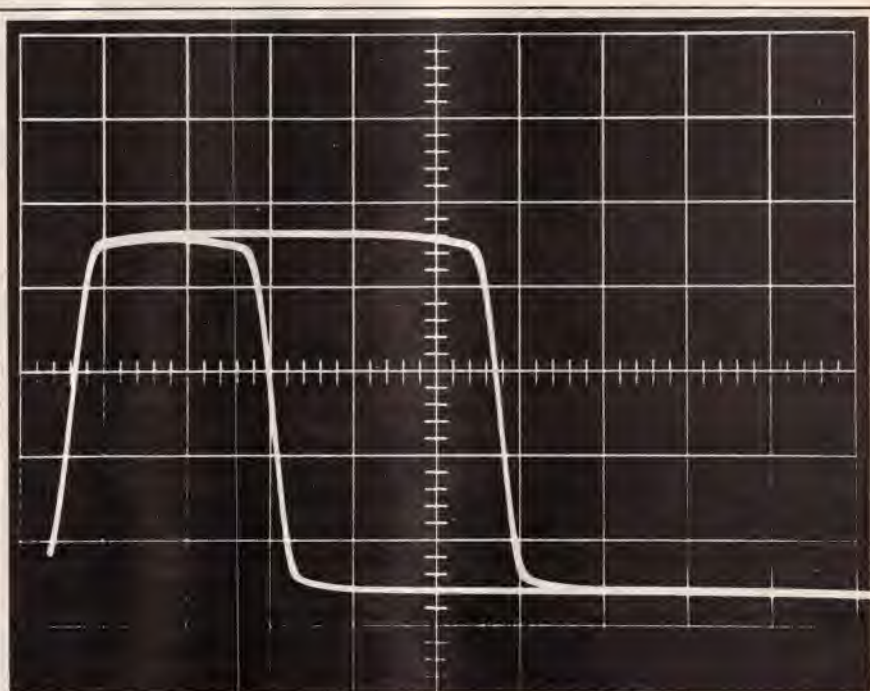
For a generation starting in 1935, the 35-mm photographer managed to scrape by on a maximum shutter speed of 1/1,000 second. And those decades of the '30s, '40s, '50s, and '60s were eventful ones, hectic years swirling with dramatic action that cried for the witness of the 35-mm camera and its quicksilver shutter. The focal-plane shutter wasn't always cranked up to top speed, but when it was it took its neat one millisecond slices of time right through the frenzy of a world nearly gone mad: through three hot wars, countless bloody conflicts, and a nightmarish cold war; through the revolt of a fourth of the world's masses; through the breaking of the four-minute mile, six olympiads, and three dozen Kentucky Derbies; into the atomic age and through the sound barrier; through the rise and fall of the Third Reich and the climax and denouement of mass photojournalism.

Nobody complained that things, least of all the shutters in the backs of 35-mm cameras, were moving too slowly.

But now even they have been speeded up. The 1/1,000-second shutter speed is fast becoming superseded by the 1/2,000-second speed on the middling and most expensive 35-mm cameras.

The 1/2,000-second shutter on the 35-mm camera can be traced back to the same source as the 1/1,000-second shutter and the 35-mm camera itself—the Leica factory in Wetzlar, Germany. When the first commercial Leica models were introduced in 1925, they had a top shutter speed of 1/500. Ten years and several camera models later, the Model G, or IIIa, Leica was offered to a depression-agonized world with a 1/1,000-second shutter. This, incidentally, was an innovation in the 35-mm system only. Larger cameras, most prominently the Graflexes used for news and sports photography, already had the 1-millisecond shutter. To this day Leitz has never outdone the 1/1,000 speed in its standard rangefinder cameras. But by the early '60s it saw its firm grip on miniature pho-

SPRING 1975



The 1/2,000-second shutter is twice as fast as the 1/1,000-second shutter—but how can you tell? POPULAR PHOTOGRAPHY had to trade in its trusty oscilloscope for a new, fast-rise-time model to chart the difference.

Leftmost trace is the super shutter's 1/2,000 second; longer trace is 1/1,000. Actually both are a trifle fast but well within standards ($\pm 30\%$).

Oscilloscope Traces By Michele Frank

tography being sprung open by the single-lens reflex camera. Thinking to make up for a late start it plotted to do the competition one better and introduced the first Leicaflex in 1965 with a top shutter speed twice that of any rival, that is, with a 1/2,000-second shutter.

Seismographs recorded no tremors on the far side of the Pacific basin once the new SLR was introduced, and Leitz itself rushed back to the drawing boards to recast its design into the present Leicaflex SL. It differed in many ways from the original, but it retained the pioneer feature of the 1/2,000 shutter.

There were still no earthquakes, but it is clear from subsequent events that all the rivals, from the Black Forest to Hon-

shu, took note of the second four-digit number on the shutter speed dial.

There is gold in the camera that Bill Pierce calls the Panaceaflex, the camera that sounds as though it will do everything. Rich benefits are in store for the manufacturer of the camera that implies even a remedy for a lack of talent. And a camera with a 1/2,000-second top speed sounds as though it is a lot better than a camera with a 1/1,000-second top speed. It is not necessarily true that if you build a better mousetrap the world will beat a path to your door, but in the highly competitive camera business it does seem that if you add a wanted new feature the competition will soon come barreling down your street.

IT'S SUPER SHUTTER! *continued*

The present list of purveyors of 35-mm cameras with 1/2,000-second shutters includes Canon, Fujica, GAF, Kalimar, the aforementioned Leitz works, Minolta, Nikon, and Vivitar, with announcements from Yashica and Zeiss and rumors from everybody else.

Some may archly ask of the 1/2,000 shutter, "Who needs it?" but serious questions are, "What is it good for?" and "Is it worth paying to get?"

As far as costs are concerned, once the price of redesign and retooling is paid, an increase in the top speed of the focal-plane shutter is one of the least costly features to provide to the customer—a trifle compared, say, to increasing the speed of a lens by a stop. (It is a very different story from the high-speed front shutter, where all kinds of problems having to do with inertia and the strength of materials have to be ironed out.) With the focal-plane shutter the faster shutter speed is achieved by the relatively simple expedient of narrowing by 50 percent the gap between the opening curtain and the closing curtain. The actual speed of travel of all the pieces can remain the same. But if the slit of light that travels across the film during the photographic exposure is reduced by half, e.g., from a tenth of the film width to a twentieth of the film width, the exposure is thereby upped from the respectable, but now prosaic, 1/1,000 second to the zippy-sounding 1/2,000 second.

Well, if it is so easy, why wasn't the 1/2,000-second shutter introduced years ago? Nothing turns out in practice to be utterly simple. Parallelism between curtain edges, constancy of curtain acceleration, and proper slit width are more than twice as critical with the halving in speed—but these are all variables well within the ability of modern manufacturing techniques to control.

Partly also the answer lies in the fact that the 1/1,000-second shutter was itself a bit ahead of its time. Films were dreadfully slow in the old days, and the opportunities to use the highest shutter speed were limited to propitious circumstances.

Finally, the late blooming of the super shutter has been due to the fact that so brief a shutter speed is somewhat outside of human scale.

Though it is true that experiments with tachistoscopes clearly indicate that one can retain a visual impression of something to which one has been exposed for so brief a period of time as 1/1,000 second, experience like this is on the order of a laboratory curiosity. As magicians



Courtesy New York Giants

The irony of shutter speed is that we've had it where we hardly needed it. For years, fast and ultrafast effective exposure times have been used with electronic flash for setup studio illustration as at right, while sports action out-of-doors has relied on the mechanical shutter that has never been quite fast enough to "stop" human action (note blurred hands and kicking foot on Pete Gogolak of New York Giants).



Photograph by Mike Levins

so well know, and as has been so amply demonstrated by the motion picture and television—we are accustomed to melding into an unnoticed blur those events whose time span is quicker than about $1/30$ second. Things that occur in the millisecond range are things that escape our notice; they are practically out of our sight, and they are thereby out of our minds.

As György Kepes demonstrated in *The New Landscape*, when we do witness through photography things of briefer duration than the snap of a finger we leave the world of our ordinary senses. We enter into an existence as alien to our daily lives as the astronauts found the moon to be different from the Houston suburbs.

In short, though action might be blurred in a photograph made at even $1/1,000$ second, it never mattered much because anything moving that fast would likely be blurred to the naked eye. For the photographer who wished to record simply that which he saw, there was no requirement for a shutter speed faster than $1/1,000$.

Of course, almost since the beginning of photography, there have been photographers and scientists who wanted to record more than what they could see—who wanted the camera to aid the eye. For their utility the $1/1,000$ -second ceiling was surpassed in the last century, and exposures as short as $5/1,000,000,000$ second are possible.

The adjective that recurs continually to describe rapid and continuous movement pictured with very brief exposures is "frozen." The results, though intriguing, are obviously artifacts. And while we have become accustomed to them, so are the queer contortions of the faces and muscles of athletes arrested in the midst of furious sports action.

Things that move slowly enough so that you are ordinarily able to resolve them with unaided vision do not suffer from being recorded with ultrashort exposures. For example, in commercial photography—from wedding candids and portraiture to advertising illustration—electronic flash is king. In these fields exposure times of $1/500$ are positively languid. Through professional photography, exposures of $1/2,000$ second have conditioned our everyday experience for years. But the very brief exposure is closer to home for the avid amateur photographer. The automatic electronic flash exposure system produces effective exposures in the range of $1/50,000$ second at the close limit where the light has to be attenuated by

IT'S SUPER SHUTTER! *continued*

means of curtailed exposure.

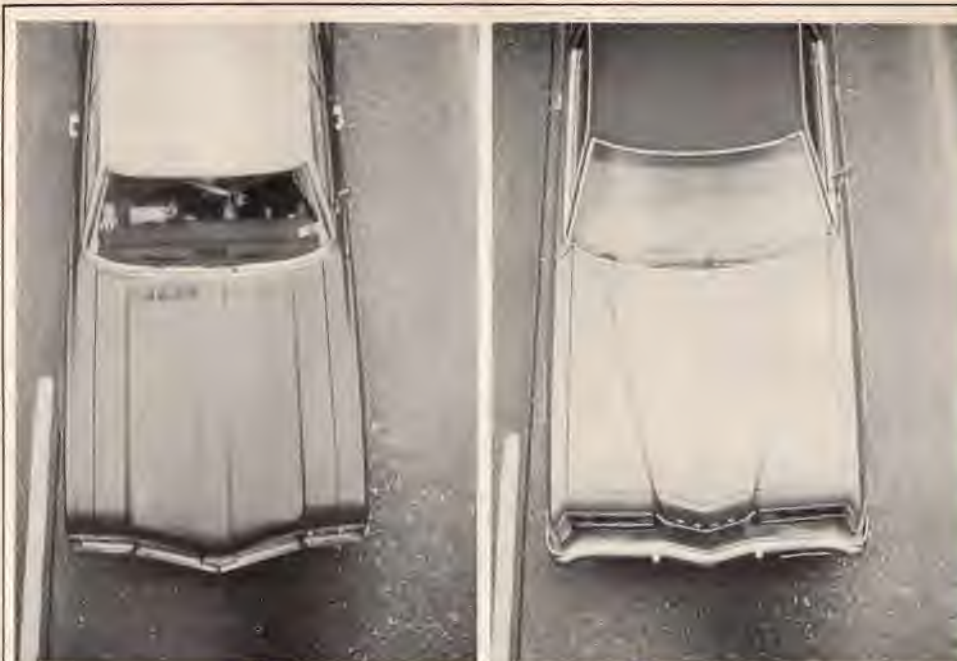
Though it is not necessarily desirable to do so, there may be a point in "stopping" action. First, it should be said that there is no absolute elimination of motion blur. If the image is moving relative to the film, then blur will occur. High shutter speeds cannot absolutely eliminate the blur, only limit its effect.

High shutter speeds can, however, confine the blur to a subliminal effect. That is, a high shutter speed can cut down the blur so much that it is not visible or noticeable. This is not a simple function. It depends, among other things, on degree of enlargement: contacts that look sharp may preview an enlargement that is blurred. It is subjective. That which is subliminal for Gerry Ford is quite apparent to Henry Ford. But the rule of thumb that designates acceptable blur for depth of field in 35-mm photography, 1/30 mm, may be taken as a starting point for discussion. (There is no finishing point to such a discussion, by the way. POPULAR PHOTOGRAPHY Senior Contributing Editor Bob Schwalberg, for example, says that his demonstrations evidence a palpable difference between in-focus motion blur and out-of-focus motion blur.)

What counts in photographing motion is the motion of the image across the film—not the motion of the subject as measured by a speedometer or some such. Thus a turtle moving across the field of a macro lens may be photographically swifter than a rabbit bounding across a field. Motion laterally across the field is infinitely faster than motion at the same velocity but moving directly along the axis of the lens. Motion imaged by a 100-mm lens is twice as swift photographically as motion imaged by a 50-mm lens.

A moment's reflection on these points should convince you that there are endless combinatorial possibilities in answering any riddles about what magnitude of shutter speed is required to "stop" action of various sorts. It might, however, be instructive to examine just a case or two.

A typical limit of natural, self-propelled human velocity is about 30 feet per second. This is a 100-meter dash in ten seconds flat. It is a trifle more than 20 miles per hour, and not many individuals can attain the pace except for short bursts, but it is quite common among athletes. What is needed to "stop" such a velocity? Let's assume a 50-mm lens mounted on a 35-mm camera. Let us further assume that the camera is held still, and



You'll not always notice it, but the 1/2,000-second shutter does stop action better than the 1/1,000-second shutter. Cars travelling at 45 mph on urban expressway illustrate the scope of difference. Car at left is not quite stopped cold at 1/1,000 second. Car at right seems perfectly stilled at magnification shown here (but a bigger enlargement will reveal that the vertical lines slicing toward the camera are a trifle sharper than the horizontal lines).

Should you trade in your camera because it only goes up to 1/1,000 second? Not for that reason alone. It'll stop just about anything you can see clearly, and if it imparts a little motion blur to the spokes of a 10-speed bike or a horse-drawn victoria so much the better. It even does a good job on a speeding squad car—but not if you jar the camera, the motion that causes the most blur. Camera motion is insidious, and the faster speed you can get, the better off you are.



not panned with the action, even though this is the practice that is typical with sports photographers. Also let us assume the worst case: the person is running directly across the camera's field of view. If we confine the blur to under $1/30$ mm on the negative, how closely can we approach the subject?

With a $1/1,000$ -second shutter, the closest we can be is 15 meters, about 50 feet, about a third of the width of a football field.

With a $1/2,000$ -second shutter, the closest distance is 7.5 meters, a trifle under 25 feet.

Of course, blur that is more than subliminal will not cause the resulting pictures to curl up like autumn oak leaves and fall dead to the ground. Slight blur will not even be noticed as blur, but just ordinary 35-mm picture mushiness. And by the time any blur is pronounced enough to be seen for what it is, it is easily excused on the grounds that the runner was indeed a runner and not a plaster cast of same.

If the motion is beyond natural human potential, then the possibility of photographic recording without blur becomes progressively more elusive. For example, the required distance from which to photograph a vehicle moving at 60 miles per hour across the field of a 50-mm lens with the shutter set at $1/1,000$ second is over 40 meters, about 132 feet. This would be halved—to 66 feet—with a $1/2,000$ -second shutter.

Again, no viewer would be surprised to see a little motion blur caused by a car operating 5 mph in excess of the national speed limit. Quite to the contrary, blur in this instance would simply add to the credibility of the photograph. But the basic geometrical facts are unavoidable if you want to get a picture of that moving car and get it sharp. For that, no shutter speed limit can be inconveniently high.

This is even more true when the motion blur is due not to the subject but to the movement of the camera and film relative to the image. Camera shake due to mechanical or human factors seldom contributes much to the effect of a photograph (though, to be sure, there are outstanding exceptions). The very slightest motion of the camera may seriously degrade the image. More than one photographer has made a fresh discovery regarding the inherent sharpness of his lenses and films after he started taking pictures with the speedlight (electronic flash). Detail appears in his pictures that he did not know he was missing.

continued on page 111



Same 50-mm f/1.8 lens was used for both shots. For moon shot, lens was aimed into rear of 25-power telescope. Pocket watch close-up was shot with extension tubes between lens and camera. Which shot is best for testing lens? Both, if each represents how lens will be used.

HOW TO TEST LENSES *continued from page 16*

the test target, but the "boy-dog" target, as Kodak's people affectionately refer to it, is one of those completely neutral, inoffensive, quiet images that most amateur photographers can relate to.

Most casual camera users couldn't care less if each whisker on the dog's muzzle was crisply defined on the final print. All they care about is that a recognizable image of the boy and his dog "comes out." For those of us who do care about the whiskers, life is more difficult.

The difficulty comes in being able to record consistently on film every bit of image fidelity the lens and its support system of camera, film, processing, enlargement, and final viewing are capable of. It ends up that what most of us test when we set out to appraise a new lens is 90 percent support system and 10 percent lens. If every time we evaluate an image, we bear this in mind, our opinions about our lenses will be bettered.

One way to make the testing of a lens most meaningful is to decide from the start that the tests will represent the kind of photography the lens will be used for. Earlier it was suggested that some shots of a newspaper page be made in order to gauge the effects on sharpness by varying the exposure times. While instructive, this test falls into the category of shooting brick walls or resolution targets—it's simply not the sort of thing most of us will end up using the lens for.

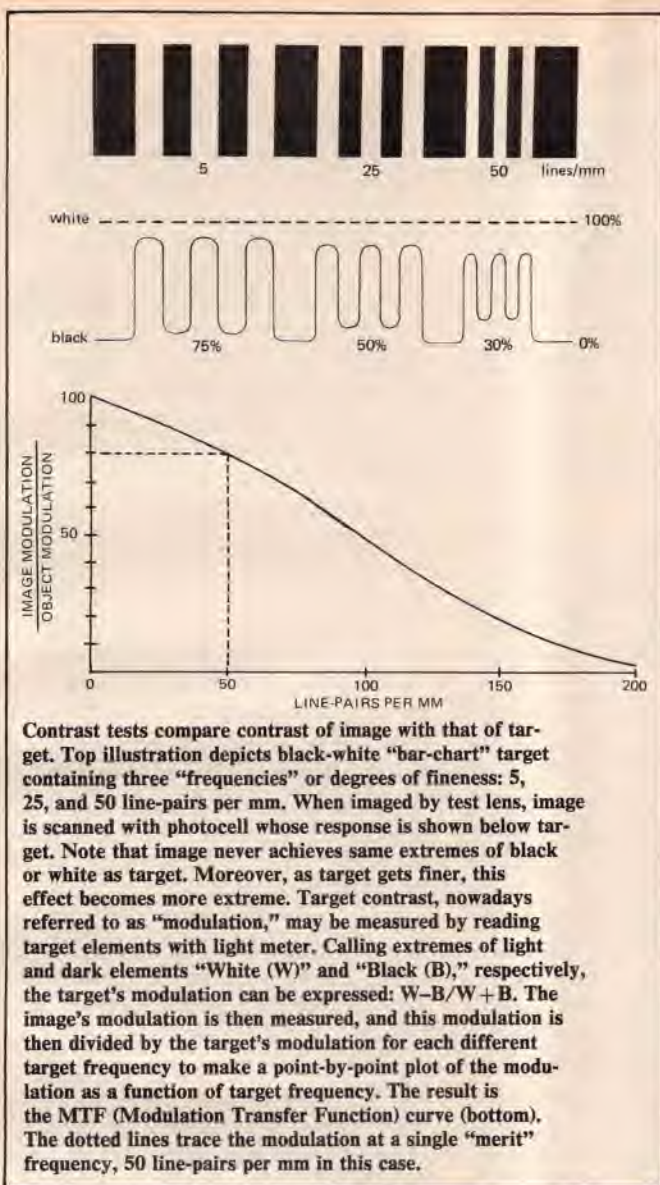
Much more meaningful to someone who shoots locomo-

tives would be a roll or two shot full of various locomotive views. Using this example, locomotives are big things, having soot-black and polished-brass extremes in their luminosity range, making optimum exposure a real problem. A good share of dramatic locomotive views are shot in $\frac{3}{4}$ view, so the front and side are both visible. This calls for a fair amount of depth of field, so a small f-stop is used. Chances are, any information gained about the image-forming properties of a lens intended for shooting locomotives would best be obtained by shooting locomotives, not brick walls.

Another example is the real curse to some, but highest blessing to others, a flare-ridden lens. Such lenses make dreadful images of fine detail surrounded by a bright background. The image contrast in the fine detail is knocked way down by the intrusion of the bright surround light, resulting in a barely discernible photograph of the detail. But for a romantic shot of a delicate scene where the misty effect is desired, such a lens is exactly what's called for.

So-called fog-effect filters, or soft-focus filters are made to overcome the flare-reducing properties of a relatively flare-free critical lens. A documentary-style shot of a workman among the clutter of his workshop, where crisp, hard-edged image detail enhances the mood is hardly the place to use a soft-focus flary lens, while an otherwise lovely girl, marred by chicken-pox scars, would suit the same lens fine.

Recalling that we began by saying we want to have confidence in our ability to make what we call sharp pictures, it



seems about time to discuss some ways this confidence can best be acquired. We'll consider that no part of the image-forming system has yet established its merit, so the confidence we seek must start at the very beginning.

We first must determine whether our focusing system is worthy of our confidence. One simple way to test this is to set up a yardstick, slanted 45 degrees to the lens's optical axis and located about 20 focal lengths from the front of the lens. Focus carefully on the 18-inch mark of the yardstick. Make several exposures with the lens wide open (to minimize depth of field). The camera must be rigidly supported on a heavy-duty tripod for this and all other tests, otherwise the results will be meaningless.

When the negative or slide is examined under at least 5x magnification, the 18-inch mark on the image of the yardstick should be the sharpest point, even though markings a short distance to either side may be acceptably sharp. If the 18-inch mark isn't the sharpest, the focusing system, and this includes our ability to see well enough through the camera's focusing system, probably needs some correction. Depending on the source of the trouble, a camera repairman or an optometrist should be consulted.

Once we gain confidence in our ability to focus critically, we can begin to establish an understanding of what some have

called the "flavor" of the lens. This encompasses the performance characteristics of the lens under a variety of conditions. What sort of image quality results when the lens is used wide open? Close the diaphragm down three stops and try again, then stop down all the way for another check. Try this group of tests under conditions where the light comes from behind the camera, from the front of the camera, and from the side.

In every case, make the same shot with and without a lens shade. I believe you'll end up agreeing with me that a lens shade is a must in most cases. The trouble is, most lens shades are compromises among form, function, and cost. The very best ones have a shape that exactly matches that of the film format, which in the case of 35-mm full-frame cameras is a rectangle whose long sides are 1.5 times the length of the short ones.

As we know, the vast majority of lens shades are round, not rectangular. Since the main function of the lens shade is to prevent non-image-forming light from entering the camera, a round lens shade would be suitable for a camera whose picture format was round. Nevertheless, a round shade is better than no shade, so use it until the industry's conscience forces them to make rectangular ones.

This may not be too far away, as a recent product announcement indicates. Sigma, the independent lens maker that has shown itself to be quite innovative, recently introduced square lens shades. It wasn't too long ago that Sigma perfected its form of multi-layer lens coating, and was justifiably proud of it. With this in mind, it's very significant that they flatly state how vital a correctly designed lens shade is in taming flare, even if the lens in question is multi-layer coated.

When the first claims for multi-coating were rained on us several years ago, the ad writers offended our intelligence by claiming that the process eliminated the need for lens shades. Rubbish. If I saw away at the question of lens shades a bit, it's because many years ago I never used them. Then I began using them and saw the consistently evident proof of their worth in the heightened contrast of my formerly "soft" negatives and slides.

Canon, having multi-coated their lenses, then mastered the technique of serially producing aspheric lenses for improved image quality at full aperture with high-speed lenses, promises to bring forth *folding* rectangular lens shades. Let's hope



this becomes contagious.

There are some photographers who consider flare a good thing to have around—in moderation. They contend that when making pictures in poor light, some amount of lens and/or camera body flare helps to sort of “hyper-sensitize” the film by doing the same thing that’s done when we “pre-flash” our film to dim light before making an exposure. This boosts the film up from the relatively poor sensitivity it has to extremely low exposure levels to the more vigorous region of its density-vs-exposure range. Whichever way you decide to swing, on the flary side of absolute fidelity in the image, or stark reality, the best way to get what you want when you want it is to learn how to get it. (Sounds like a song title, no?)

After performing the series of tests to determine just how the lens responds to varying light levels and directions, we should have a reasonably good idea of the way we must vary our exposure adjustments for each condition in order to obtain optimum image detail.

Now we learn what our hand-held low shutter speed threshold is for the lens/camera combination. A useful rule of thumb is the reciprocal-of-focal-length one. This simply states that for the hand-held slowest shutter speed for any lens, take the reciprocal of the focal length. For example, with a 500-mm lens, use a shutter speed of 1/500 second or faster. For a 28-mm lens, use 1/28 (1/30) or faster, etc.

Individuals vary in their ability to steady a camera, so each of us has to determine his own low shutter speed threshold. Just remember that it will vary with the focal length of the lens being used. Make these test shots of stationary, inanimate objects containing fine detail, and located at about the distance most of your shots with the lens will be made.

With confidence in our ability to focus critically, make optimum exposure determinations, and hold the camera steadily, the rest of the enterprise known as graven image making is a matter of personal expression. To know, really know, just how sharp an image you can place on the film’s surface is as important as knowing how quickly your car will accelerate. You may never use either properly to its limit, but it’s good to know what the limits are. 

began developing the drive and competitive determination that characterize her work today. “When I went out on a story for the *Trib*, she says, “I always considered myself the paper’s *third* photographer. I knew they were already covered by the standard pictures the A.P. and the U.P.I. men made, so I could take a chance and go after some human interest or special angle that nobody else would cover. That way, if I came back with something terrific—great. If I didn’t—O.K. We could still fall back on the wire services.

“Another thing I did on the *Trib* was get myself a Honda, and the minute we heard something was breaking, I’d rush there and back on my Honda, and we would even beat the *Daily News* with pictures.”

Miss Krementz resigned before the *Herald-Tribune* folded, and with the newspaper experience tucked under her belt, took off on her own to free-lance the Viet Nam war in 1965. She spent a year photographing the people rather than the war, and those pictures appear in a book called *The Face of South Vietnam*, with text by NBC correspondent Dean Brelis.

In 1966, Miss Krementz went to work for the now-defunct publication *Status/Diplomat*, which she enjoyed especially because she had a lot of freedom and could control her whole output, including story, pictures, and layout. Unfortunately the magazine folded.

By the time she went to work in 1968 as one of the original contributing editors on the newly founded *New York* magazine, she was essentially a self-made photographer with plenty of sharp pictures, but an unfocused career.

She published another book in 1969 called *Sweet Pea, a Girl Growing up in the Rural South*, and around that time fell into what she calls “a bleak period” in her life. She worked as a correspondent at *Time* magazine for about a year and a half, writing and not taking pictures.

“I am a competent writer,” she says, “but I *really* like to photograph. Writing is so lonely. You are all by yourself with the typewriter. I much prefer being out photographing people, and photography gives me real pleasure while I’m doing it. But having writing skill does make you more valuable as a free-lancer. You can supply good caption material for editors if there’s no reporter along. And of course you can write books if you want to.

Miss Krementz’ picture files contain pertinent notes along with her contact sheets, so she is generally not at a loss for data should a publication need it.

This is the kind of thoroughness that she recommends to young people. It is an important part of the pro’s discipline she feels so many people overlook when they are struggling to get a start. It is one more facet of “doing your homework” she feels no photographer should neglect if he wants to get all As, and the fat checks that go with them.

During her writing stint at *Time* Inc., somebody else saw her photographs on her desk and started her on the free-lance road. So in 1970 with ten years of invaluable “hacking it” behind her, a host of “contacts” throughout the media, and a consuming interest in writers, she made the move that finally made her name a household word in the publishing business. She decided to fill the author picture vacuum. And has she ever!

At press time for this article the Krementz “Stock List” of authors totalled roughly 542. It also included 21 political figures, 15 artists, 74 people in show business, 3 sports stars, 14 “personalities” and 10 “places.”

Miss Krementz’ sales and business sense is acute. “I have always loved selling,” she says. “When I was a little girl I went around selling my little boxes of greeting cards, and I stuck at it even though the neighbors were patronizing. Today I think it is very important for a photographer to be able to sell, although I know a lot of people don’t like to. I prefer it because I can keep better control of my work.”

Her sales terms are the subject of much comment in the publishing business. Some people think she is inflexible, some think she is intractable and some think she’s perfectly fine. Miss Krementz herself hews to her own line and does not care what anybody thinks. When she sells an author picture to a publisher, for example, she gives reproduction rights for use in connection with one book only. She also specifies that her credit line is to appear adjacent to the picture every time it is used. Thus one picture may produce a long string of Jill Krementz credit lines—on the book jacket, in all the advertising, in all reviews where the publisher supplies the picture, etc. Woe be to the publisher whose layout artist forgets to run her credit line with an ad in the *Podunk Gazette Sunday Book Review*!

The rubber stamp on the back of all Jill Krementz photographs states specifically: “Not to be reproduced without per-

mission, or without adjacent credit line."

Miss Kremenz is a member of the ASMP and many people feel that she has done more to uphold their rate structure than any other photographer. Others feel, on the other hand, that she takes unfair advantage of her subjects when she does their pictures "on spec" to build up her own files for future sales. Miss Kremenz always gives such subjects complimentary prints of the photographs, and recommends this technique to young beginners. "You should always follow through," she says. "People will appreciate you for it." She also recommends to the young that they get experience in photography by taking pictures of their friends and letting the friends pay for the film and printing expenses.

As for herself, Miss Kremenz feels that no photograph of hers should be published or used in any way unless she receives payment for it. Of course she did not start out that way, and there are one or two known exceptions. An author who gave her an early start recalled in a *Saturday Review* article that she once asked him if she could take his picture in return for her credit line on the jacket of a book he was just writing. And she did recently take a batch of her pictures to the Museum of Modern Art and gave them eight prints for a present, which any photographer can do if the Museum wants to take them. But generally with Miss Kremenz, it is cash on the barrel head, or as one news magazine editor said of her, "no free art—even when it's advertising her!"

The remarkable thing about Miss Kremenz is that by determination, hard work, endless promotion and attention to detail, she has managed to attain her dream while still in her early 30s. Compared to an artist like André Kertész who feels he was not appreciated in America until he was 70, Miss Kremenz' career is the all-American-dream success story.

Some people call it lucky timing. Miss Kremenz does not agree. "I wasn't lucky," she says, "because a lot of people have just as good luck but no self-discipline or follow-through. There are some people who will never get to assignments on time."

The resounding success of her author specialty, plus getting to assignments on time, have helped Miss Kremenz create a reputation that is propelling her into ever-widening fields. By now she had had pictures in several dozen publications in America and other countries. And she now does a considerable amount of work on assignment for Time Inc.'s recent new venture, *People* maga-

zine.

John Dominis, picture editor of *People* says, "We are particularly designed for Jill, or maybe Jill for us. She's done a lot of personalities as well as authors, and fits in very well with us. We have a very small staff and work on a week to week basis, so we can use a person like Jill, who is one of the quickest photographers I know. She's not like some people who need a lot of time to get into a personality. She knows that important people don't have a lot of time, and she thinks two hours is a lot!"

"Jill is strong and aggressive and she can somehow make people perform for her. She will always come through with at least an adequate take. And now and then she brings a good picture, or even an outstanding one. Recently she did a handsome picture of Ernest Hemingway's grand-daughter, Margaux Hemingway. The subject was interesting, the background was interesting, and the whole thing was sharp!"

Dominis likes to work with Miss Kremenz because by now she knows so many people and in a way that helps everyone get along better. "She's a powerhouse," he says. "She's not shy, and she knows how to condense a whole story into a breakneck shooting session. For instance, she recently did one of her best jobs for me—covering Jamie Wyeth. She rushed down to Pennsylvania, and in a couple of hours shot him doing all the things he might do in a whole week. She even got him to change clothes so each picture had its own flavor. Then she dashed back, and we developed the pictures and did the layout all in the same day. I think it ran six pages. On a job like that she'd get either day rate or page rate depending on which was higher. So she did alright, and we were happy. We've been using her for a lot of things."

You never know where your specialty will lead you. So if you're floundering around, or want to make a change, take a tip from Jill Kremenz. Specialize! 

MY LIFE WITH 35-MM *continued from page 22*

handled over the course of the decades.

But the 35-mm has been the one consistency through all my camera experience. Whereas the others have come and gone, the miniature has remained to do all the work I need to do with a camera. True, it cannot "do everything," as many 35-mm zealots insist, but I don't want it to do everything. For the picture opportunities that have come my way,

the 35-mm usually has been adequate.

The photographs illustrating this article are a sampling of the pictures I have taken over the years, most of them with 35-mm cameras, some others with the Rolleiflex. The latter I include because in a certain stretch of years, roughly from mid-1940s to mid-1950s, the Rollei for all-around purposes seemed the most convenient. Everybody was using it, but most were at the same time carrying 35-mm, and so did I, as I pointed out at the beginning of this piece. As time went on, the 35-mm took over for practically everything I do.

And what I have been photographing is similar in range to what all amateurs photograph—vacation pictures, shots at fairs and similar occasions, street scenes, crowds, children, plus some of the personalities that make up my world of professional photographers, gallery people, editors, and others more or less in the public eye, that is, my public of photography.

Today I am more convinced than ever that the 35-mm is the camera of the photographic medium. Whenever photographers move away from it—to 4x5, for example, they lose appreciably in human appeal, and certainly in spontaneity. The camera facilitates the approach that encourages photographers to respond to life in warm and understanding terms, and to give the observer of his pictures an experience he can relate to. It has been so from the start, back in the early 30s, and will continue to be so.

If basically the miniature has not changed appreciably over the decades, there have been of course great innovations and probably more will be introduced in the future. They won't make any better pictures but they do here and there permit easier handling and offer useful conveniences. Such improvements, by permitting quicker responses to subject matter, yielding sharper images, and giving more consistent results, are valuable mainly as technological advances of the medium, with little if any effect on the esthetic, except possibly as they free the photographer to exercise his creative potentials more readily.

After some complaining by 35-mm photographers that miniatures are getting increasingly heavy as new devices are added to camera design, lighter, more compact cameras are blossoming into a trend toward less weight and bulk. With 35-mm's supremacy long assured, such a movement is bound to advance the cause of the miniature more rapidly than has been the case to date. 

life. Truly rechargeable power sources. Better color balance. Adjustable heads for direct or variable-angle bounce lighting. Interchangeable heads for varying outputs, different reflectors, or bare bulb flash. Lenses for the flash head, to spread the light to cover a wide-angle field of view. And above all, automatic flash.

Auto flash units have a sensor to "read" the flash light reflected by the subject. The first units used dump circuitry: when the sensor received a certain amount of light it would switch the remaining power from the flash tube to another, "black tube" circuit which used up the power without adding any more light. Thus the flash was cut off quickly so as not to overexpose a close subject, or was left on for a full-length flash to illuminate a more distant subject adequately. But this had the disadvantage of using the entire power charge each time, which meant you exhausted the energy of your power source with the same number of flashes whether all your subjects were distant or all close up; in addition, you had to wait for the full recycle time after each flash before taking the next shot.

The newest automatic units have thyristor circuitry, which cuts off the flash without losing power. When the sensor has received enough light, whether the subject is near or far, the circuit simply cuts off the flash tube; the power is not dumped. If only one-third of the charge was used to light the subject, two-thirds remains for the next shot. That means faster recycling and more individual flashes from the same power source. Some thyristor units allow you to choose two or three different f-stops at various distance ranges without sacrificing automatic operation. Whatever system is used, automatic flash helps produce more consistently exposed pictures and far fewer duds—a blessing in anyone's photographic life.

Also very new are flash units with very fast recycling times, so fast that they can be used with motor-driven cameras for exposures of up to three frames per second. Ten years ago that would have been an incredible thought. (Except perhaps in the minds of those happily mad scientists in the electronic flash labs who have been doing all this. The next step could be a pocket-size unit that recycles fast enough to synch with a movie camera at 18 or 24 frames per second—a blinding thought.)

Exposure meters

Exposure meter listings show a drop from 1965 to 1975. There were 70 conventional meters, one flash meter, and four color temperature meters ten years ago. This year there are 53 conventional meters, eight flash meters, and six color meters. Many more conventional meters now use cadmium-sulfide cells than before, but the drop in number of models certainly reflects the great increase in built-in camera meters. Flash meters have probably been dealt something of a blow by the newest generation of automatic flash units. These meters will continue to be very valuable in studio work with large units or multiple-flash setups, and on that basis may very well hold their own or even increase in number. But the typical 35-mm photographer will probably choose the automatic unit and not need a flash meter. The increase in color meters is of course due to the ever-growing use of color materials in photography at all levels. The meters themselves have changed comparatively little. It is quite possible that we will see some major developments here in the next ten years.

What about the materials of photography? Nothing truly astonishing has happened with films, although there have been some significant changes. Ilford improved their black-and-white films to produce a new generation during the decade. Kodak has kept fiddling with some emulsions, making Tri-X in particular more and more "improved." Their biggest contribution was to revise their recommendations so as to produce less underexposure and less overdevelopment than their data sheets had called for earlier. Apparently they took a look at what good 35-mm photographers really did to get outstanding results. Kodak did give us Type 2475 Recording Film. Its ASA rating of 1,000 has made lots of available-darkness photographers very happy, and has made it possible for vast numbers of beginning photography students to avoid confronting the whole subject of proper exposure.

A major contribution in black-and-white has come from H&W, whose improved Control 4.5 Developer has made it possible to get full-scale rendition of normal-contrast-range subjects using very-thin-emulsion, high-contrast films such as their own VTE Pan and VTE Ultra Pan. The result can be virtually grainless enlargements at scales of up to 50x or more. And that may reveal more about your dirty enlarging lens or misaligned enlarger than you ever wanted to know.

In color films we have seen some name changes, lost a few emulsions, and gotten a couple of new ones. In particular, Kodak has done it again. In 1961 they took away our Kodachrome (there was a scramble to fill freezers with it back then) and replaced it with Kodachrome II, which almost everyone grew to like immensely. In 1965 they gave us Kodachrome-X. Now they are taking away what we have gotten used to, and are replacing it with the improved Kodachrome 25 and Kodachrome 64.

These new films have brighter, cleaner colors in most hues, finer grain, and apparently greater sharpness. We haven't had them long enough to find out what they can do; after we have, we will be able to find out what we can do with them. (A stray thought about change: when platinum printing materials priced themselves off the market, around the time of World War I, a number of devoted pictorialists completely gave up photography in sorrow and disgust with the materials that remained available for their use. I don't think anything of that sort has happened since. Either we are punch-drunk from continuing change, or we are much more open to exploring what our medium can do at any given time now rather than to sigh for what it *used to be*.)

The accompanying list chronicles the disappearance and appearance of 35-mm films over the decade. Shed no tears over the past; if silver gets any more expensive, we will have to pay more in order to get along with less.

In the darkroom, three areas have seen significant growth or developments: processing devices, color printing, and the resin coating of papers.

Black-and-white stabilization processing existed in 1965, but it has become more and more important since then, especially in professional studios. It is fast, consistent, and economical. It eliminates the need for a full-scale wet darkroom, and processors are available for less than the cost of most enlargers. To find out just about everything there is to know about it, look up Cora Kennedy's article, *The Latest Word in Stabilization Printing*, in the December, 1974 issue of POPULAR PHOTOGRAPHY.

Kodak drums continue to dominate motorized color print processing (as they deserve to), but there has been a proliferation of hand-powered tubes, drums, rocking trays, and similar devices to speed and standardize color print processing. And now we are getting accessory motors to power the hand-activated units.

Color printing is the real darkroom story. "Revolutionary" approaches have come and gone since 1965, but some have remained. We now have faster, easier, more reliable processes, and even—under certain conditions—two-step processing. We have transistorized voltage regulators and timers for greater accuracy, and enlargers with fade-proof dichroic filters. We have an array of matrices to help determine proper filtration (whose real function is to help us learn faster to see with our own eyes what needs to be done). What we are only beginning to have is a real shake-out and refinement of color materials, chemicals, and processes so that a first mass generation of photographers will have something consistent for a period of years to work with while they grapple with the problems of expression in color. The shake-out has begun, but will continue—this will be the biggest area of development in the next ten years.

In black-and-white, many papers have donned resin coats (like color papers) to absorb less solution for faster processing and drying; more will follow suit. We surely are rapidly approaching the time when photographic "papers" will be all-plastic. In the meantime, the coated papers have had trouble with haze and with dry mounting.

The haze appears over the print surface upon drying, degrading blacks and creating a gray shininess that proclaims "flat paper surface" in conflict with the image's attempt to say "real space and depth." The haze simply reflects and scatters too much light before the light has had a chance to reach the image; the result is veiling, not glossiness. Part of the problem seems to be in proper drying, and heated dryers specifically for resin-coated papers are just beginning to appear.

New dry mounting materials particularly suitable for these papers are also beginning to appear. Older materials require higher temperatures for proper bonding than the resins can stand up against. For everything to do with resin-coated papers, the future lies ahead.

More has happened in photography than only these things, but I warned you that this was a selective, subjective look. It is time now for the Olympian, summarizing overview of the decade:

(1) No one has revolutionized 35-mm photography.

(2) Several have come close to doing very revolutionary things, especially in lenses and in color printing.

(3) It is costing us more.

(4) So far it is worth it.



WHAT'S AN LED

continued from page 100

use LEDs is the Nikon F2 in its F2S finder, which replaces the standard match-needle finder. In the Nikon arrangement, two red lights, shaped like arrowheads, are seen. When both lights are on, exposure is correct: when one light is on, exposure is either under- or over-, depending upon which of the two arrowheads is lighted. Indicative of the sensitivity possible with LED systems is Nippon Kogaku's statement that the Nikon F2S meter reads as low as EV Minus 2, representing an exposure of six seconds at f/1.4 on ASA 100 film, while the standard Photomic meter, by contrast, starts at EV 1, representing an exposure of 1 second at f/1.4 on ASA 100 film. One of the most elaborate arrays of LEDs promises to appear in the new Yashica-Zeiss Contax. A 16-dot LED system is used to indicate shutter speeds (from bulb to 1/2,000 second) plus operating mode, whether automatic or manual. When the Contax is used manually, the LEDs are used to indicate shutter speed and a needle is aligned with the light-emitting diode. A silicon photo diode is used as a light detector in place of the CdS cells, which would have been used barely three years ago, another sign of progress.

The two greatest advantages of the LED systems are increased sensitivity and durability. The LED display in the viewfinder can be seen in virtual darkness, where a needle cannot be seen. And since there are no moving parts, the camera equipped with an LED system is less prone to suffer from sudden shocks or similar misadventures, which keep exposure meter cameras in the repair shops.

Actually, the LED system discussed here is the final phase of a marvelously complex, amazingly compact electronic control system compressed and twisted and packed in around the camera body. Without microminiature circuits, for example, or flexible circuit boards, or integrated circuitry, there would not be an LED system. Through modern manufacturing methods, a circuit board with some 400 components—resistors, capacitors, wiring—is compressed to a chip measured in millimeters.

The glowing LED readout is the final step of a control process that begins with the sensing of light through the camera lens. Depending upon the particular camera, the light is sensed by a CdS cell or a silicon cell.

In the case of a CdS cell, the light af-

fects the ability of the cell to permit a flow of electricity, in effect, turning on a regulating valve. With the silicon blue cell, an amplifier circuit using an FET is used to amplify the relatively small current created by the photocell. The FET is a solid state device which has three terminals: current flowing through two terminals is amplified by a voltage being applied to the third terminal.

This current then passes through a computer circuit that feeds into the exposure equation the film speed and aperture variables. Two comparator circuits then take this information, one circuit feeding data into an electromagnet to operate the shutter speed control, the other going into a logic circuit that feeds the data into the LED digital readout circuit.

This is actually a general pattern of what happens. Various cameras will use somewhat different configurations depending upon the particular design and whether the camera is automated or semi-automated, aperture-preferred or shutter-preferred.

The technical virtuosity that has made LED systems for camera readout is beyond question. There is equally little doubt that within the next few years, more and more cameras will switch from needle systems to LED systems. Skeptics may question the ultimate need of such sophistication but that is really a question that every photographer must answer for himself. Edward Weston made masterpieces with a view camera only slightly removed from photography's beginnings. On the other hand, most photographers demand much more capability from their cameras, including the ability to function almost immediately under the widest range of conditions. For these photographers, the new photographic technology will go far to remove any barriers between the perception and execution of a picture.

IT'S SUPER SHUTTER!

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Lateral camera motion as slow as two inches per second—about one mile per hour—will palpably degrade an image made at 1/1,000 second. Here the 1/2,000 shutter cuts the harm in half, where it sinks from sight. This is particularly beneficial where camera motion is most critical, at macro distances and with long lenses.

There are some other practical virtues attached to the higher shutter speeds.

Sometimes today's fast films provide us with an embarrassment of riches. Under conditions of ample lighting the required f-stop at the 1/1,000-second shutter speed may be so small as to provide too much depth of field. The photographer may yearn for a neutral density filter or for an additional shutter speed to let him open his lens additionally for more selective focus, for greater blur of that part of the image in which he is disinterested.

There is some concern when exposures are very short regarding a phenomenon known as high-intensity reciprocity law failure. Inherent in silver halide photography, this effect manifests itself in very short exposures as reduced sensitivity to light, lessened contrast, and, with color films, various color shifts. My practical test however showed no discernible differences of density, color balance, or contrast due to the use of a 1/2,000-second shutter. Where furnished by the film manufacturers, the data indicates no deviation from the reciprocity law for 35-mm films over the entire range of exposure suitable for manual camera operation, with only some minimal effect on color negative film of such small extent that it safely may be ignored, and a slight development increase for black-and-white film. I believe that with modern films, the modern 1/2,000 shutter should present little problem from reciprocity law failure.

So far the arguments in favor of the 1/2,000-second shutter, while persuasive, fall short of being decisive. But there is one application where the photographer may feel that the latest shutter speed is vital.

Photography stands on the brink of full automation for virtually all the premium class 35-mm cameras. So far there have been two approaches to this camera automation: In one the aperture is automated, i.e., the lens opening is chosen automatically at the moment of exposure by the reading of a photocell. In the alternative system it is the shutter speed that is selected automatically by the camera mechanism.

For the first system, where you choose the shutter speed and the camera chooses the aperture, there is no effective difference from conventional cameras regarding the shutter mechanism or operation. Old or new, if it is 1/1,000 second that you chose, it is 1/1,000 that you get.

This is not the case with the aperture-priority cameras. They have their advantages: a less complicated coupling between camera and lens and a more electronically oriented camera body

mechanism. But they do not permit the user the straightforward selection of his shutter speed when he wishes to "capture" action with an automated exposure.

Instead, under these circumstances, the operator *approximates* his shutter speed by choosing an aperture that is likely to call forth the right shutter speed under the general conditions.

However, in order to provide himself a little leeway on the bright side, the photographer is likely to be driven to a speed that is a stop or more under his ceiling, a speed less than his maximum for safety's sake.

If conditions call for exposures varying from one shot to the next from f/11 at 1/250 to f/11 at 1/1,000 second, for example, the photographer is not likely to set his lens at f/8 with a top shutter speed on his camera of 1/1,000. To do so would surely risk overexposing some of the pictures made in brighter parts of the locale, not terribly objectionable in black-and-white, but quite a sacrifice with color transparency films. Thus the photographer is driven to the f/11 setting. This means that his average picture under the described conditions would be exposed at f/11 and 1/500. Many photographers, myself included, would consider this to be an unsatisfactory compromise where the subject is action.

The 1/2,000-second shutter becomes the equalizer between the two approaches to automating the 35-mm SLR. With a 1/2,000 shutter and the conditions described above the photographer would set his aperture-priority-system lens at f/8. His average picture would then be shot at 1/1,000 second. Where the lighting was extraordinarily bright, the exposure would be 1/2,000 second. And even in the darkest corner of the scene the camera would deliver some near "correct" exposure on his film.

Thus it seems the 1/2,000 shutter is an innovation whose time has come. It was possible years ago, but the films weren't there to make it useful. Now the films are here, and so are new camera designs that are made better substantially by having the new feature. It is in the nature of the 35-mm camera that the super shutter will not burden the consumer with a vastly more expensive aperturancence of dubious value. Just the opposite; for many users its value may be high relative to any additional cost. Pros and cons aside, competitive forces seemingly have installed it as a fixture on the ubiquitous, high-grade SLR. It will probably become one of the small blessings of the photographer's life—enjoy. 

PRINT QUALITY

continued from page 29

believe that anyone would limit himself to the first concept on the list, that a photograph has good print quality if it has a deep black, a clean white, and a long range of grays in between. This notion is then extended to the idea that only a print with such a tonal range can be considered good, so that photographers limit themselves to this kind of print. Naturally, this very severely limits what they can do with the medium, because they don't permit themselves to make the many kinds of prints that don't require such an extreme tonal range. Since it's such a limiting idea you wouldn't think that many would fall for it, but I've run across hundreds who have, mostly programmed to think that way by teachers and camera club "experts." Often, they try to use it like a recipe, assuming that if they get the required tonal range they will automatically have a worthwhile picture. This is obviously not true, a pathetic example of art by the numbers.

Surely, there is nothing wrong with a long tonal range, for it is often an important part of truly masterful photographs. The error is in thinking of it as an absolute into which all images must be forced, whether it fits them or not. Such a rigid approach will ruin more pictures than not. But this is one of the main problems with print quality standards in general: Because people are mainly unaware of how they are using them, where they came from, and what they mean, they tend to use them as absolutes and to obey them as if they were golden calves.

Item 2 (high visibility and clarity) is a concept of such limited scope that it would be hard to imagine anyone getting hung up on it as his single guiding principle for print quality. However, some people, especially those who exhibit their prints, do get a bit carried away by it. The thing they tend to forget in their efforts to make their pictures highly visible is that such carrying power has no value whatever in itself. A little skunk has more carrying power than the boldest picture, but that doesn't mean we prize him for it.

Item 3 (tonal richness, or brilliance) is a considerably more dangerous quality standard, and many have fallen for it as an absolute—often combining it with 5 (fits an established category) and 8 (beauty). For a person really immersed in photography it is difficult to say no to a print that is brilliant, beautiful, and fits neatly into a well-established and long-

defended print quality category. For such a photographer the enticement is still there even if the picture is also stupid, trite, utterly devoid of meaning, and empty of redeeming social value. Since this type of picture can have so much power over a person who is really sold on the prevailing notions of quality, it is no wonder that so many people have willingly fallen into the trap of using their photography in this manner.

One would think it impossible to make a picture combining beauty and meaninglessness, because beauty can be considered as a form of meaning in itself, or at least as its own excuse for being. However, photographers have been doing it for years and show no signs of quitting. A famous example of this is what the members of the Photographic Society of America did to themselves some years ago and are probably still suffering from, though I don't know for sure. They got so totally carried away by their limited and regimented ideas of print quality that they turned all their photography into petrified triteness. Indeed, a print had hardly a chance in one of their salons unless it embodied at least one ancient and decrepit cliché, the more obvious the better. Though

their pictures often had fantastic print quality it was usually meaningless, because it was approached as a holy absolute, an end in itself rather than a means.

This all came about because they attempted to refine their picture quality ideas to the utmost, which would seem to be a most commendable goal. However, they mainly limited their efforts to print quality and compositional quality, largely ignoring such other qualities as meaning, social value, educational value, entertainment value, and so on. I think their main reason in thus limiting themselves is that they were able to talk coherently about print quality and composition, while the other qualities were quite beyond them. In order to make their print competitions work they had to judge them on the basis of factors they could talk about. Though the competitions then thrived the resulting salons were often only fit decoration for homes for the retarded.

The PSA debacle may seem very remote to you, but I assure you that this same kind of thing is still happening all over the world today. In England, for example, practically all the photographers, both amateur and professional, have fallen victim to it. A good indication is

that most of the prints you see there look as though they were printed 3 years ago for a now extinct photographic annual.

In both England and America the misguided efforts to ultra-refine print quality led photographers to limit themselves to perhaps six or eight kinds of quality, though there are actually many kinds. Only these few were slick enough to get their acceptance. In turn this led them to limit severely the kinds of things they would photograph, because relatively few things would permit them to make the kinds of prints they wanted: backlit glassware, sand dunes at dusk, sailing ships in the mist, Rembrandt-lighted old men with beards, romanticized nudes, silken kittens, etc. Then everyone started photographing the very same things again and again, striving for the very same kinds of beautiful print quality. Naturally, this nearly destroyed their photography, for imitation of this sort is a deadly enemy.

I think that Ansel Adams, famous for his printing, repeats some of the mistakes of the PSA, but on a more sophisticated level. I wouldn't call him trite or lacking in imagination, yet many of his pictures have a deadly sameness about

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them, because they have the same kind of print quality, the same kind of beauty. Even beauty can pall on us if we can only see one kind of it, which is all that Adams offers us.

We certainly don't have to worry about Adams himself, for his fame and artistry are well established, but we should be concerned about the many who have come under his influence as a teacher of famous workshops. It should be seen that his approach to printing is one that can be easily ritualized, made into a sacred cow. Through the years I've met so many people who are worshipping this particular cow that I have strong reservations on Ansel Adams as a teacher of photography. Though it is not necessarily his intention, one of his main fortes is in turning out photographers who are miniatures of himself. Because they don't see the Adams quality concepts from a large enough perspective, they are all the more tightly imprisoned by them. Perhaps the thing to be most concerned about is that all over the country, the world in fact, teachers of lesser fame are doing the same thing to their students—imprisoning them in unduly limited quality concepts. Once they are securely in these prisons it is extremely difficult for them to escape.

I think that Adams' main tool for turning others into near-duplicates of himself is the Zone System, mentioned earlier. If one can see it merely as simplified sensitometry, a system for manipulating tonal contrast so that tones of a photographic subject can be compressed or expanded in a negative so that they will fit a given printing paper, then he will have no trouble with it. Indeed, he will find the Zone System a very useful tool.

With the help of Minor White and others, however, Adams has turned the System and "previsualization," which is an important part of it, into a complex and compulsive mystique. It is loaded to the brim with ritual and mythology and a nearly infallible way of getting art by the numbers. As such it is very attractive to many people and difficult to escape once one is deeply involved with it. One reason is that it actually works: If you want to get an Ansel Adams or Minor White-type print, the Zone System provides an effective recipe for doing it. Moreover, both Adams and White make beautiful prints, which is another succulent carrot dangled in front of the willing rabbit.

My main objection to this is that the Ansel Adams type of print quality is only one among many. People shouldn't limit themselves to it, for it may not fit them

well at all. Though Adams is a fine photographer, this doesn't mean that turning others into replicas of himself, intentionally or not, will be good for them. Indeed, one should *never* be led to imitate anyone less than a god. Finally, the type of imitation inspired by the Zone System is, in my opinion, one of the worst forms of self-denial in a photographer. For such reasons I say use it, but use it with care and with both eyes open.

One of the quality notions devoutly followed by devotees of Adams, members of the Photographic Society of America, and the like is that a print is good if it shows reality at its best. The idea itself is certainly all right, but the way that it is interpreted is not. Surely, we all need to be made aware of all the good things around us in order to increase our ability to carry on. Photographers who bring us such an awareness should have an important position in our culture. However, the quality-cultists turn this basically good idea around and use it backwards.

The crux of their mistake is in the way they think of reality at its best. Instead of seeing reality as an endless immensity literally stuffed with things of value to man, they seem to see it as a senseless and threatening chaos with just a few tiny islands of goodness floating in it here and there. The way they identify the islands is the backwards part of what they do. If they photograph something and it converts into a print with a pre-selected kind of quality, then they think they've seen and recorded reality at its very best. That is, they use pictures embodying very limited quality concepts as a means of identifying and defining the good in reality. Indirectly, this is a way of saying that photographers know so much about beauty, goodness, value, etc., that they can accurately define the universe by analyzing their own prints. Since many find this notion very attractive it's no wonder that so many follow it. It's backwards, of course. We should use reality to define photography, not the other way around.

Another tricky concept followed by many is the idea that a picture has good quality if it shows what things really look like. The basic idea seems innocent enough, but underneath it is both ignorant and warped. It assumes that photography looks basically the same way to "everyone who knows how to see" and that what it looks like can be accurately and exclusively defined by certain kinds of prints.

However, it is well known that what things look like is an entirely subjective phenomenon that takes place in the eye

and brain of the individual. The world looks as many ways as there are sighted creatures within it. Thus using a few kinds of prints to define how it looks to the whole human race is both ignorant and preposterous. Photographers who add the proviso "to everyone who knows how to see" are displaying additional naivete, for the underlying assumption is that only photographers belong in this category, which just isn't true.

Truly, photographers *do* know how to see—like *photographers* see, but that doesn't mean that their over-all perception is better than ordinary. Though some people use the medium to expand their perception, there are probably many more who use it to limit themselves. The major means for this self-limitation are the very quality concepts being discussed in this essay. My main motive in writing it is to help photographers stop blinding themselves. By thoroughly examining the unspoken quality assumptions that they permit to rule them they can go far in removing their self-imposed blinders. However, if they prefer to go on worshipping their sacred cow—as many will—I can only wish them well.

It is interesting that the photographers of the world have all jumped to the conclusion that they can see, while no one else can. If it were true we could let it go at that, but it isn't. How would they come up with such a strange idea? I suspect it comes mainly from two sources: their memories of their own difficult struggles to learn to see like photographers and their contact with others who are still learning.

Of course, we've all been told again and again that becoming a photographer is a process of learning to see, period. We don't customarily add the phrase "as photographers do." I doubt if others who have also "learned to see"—painters, sculptors, weavers, pot makers, calligraphers, architects, etc.—have the great certainty concerning their perception exhibited by photographers. And there are many very perceptive people who have never worked with any art form whatever.

Learning to see as photographers do is a task of considerable magnitude and difficulty. One reason for this is that it requires a person to give up a way of seeing developed throughout his lifetime in favor of one cherished by photographers as a group. Though he may have never thought about his personal way of seeing, he nonetheless has one as a matter of sheer necessity in this visual

world. Thus when he feels it under attack from the traditions of photography there may be considerable inner resistance, which makes learning the new ways very difficult. Yet he does his best to deny his personal vision in favor of the strange one, because the latter has all the time-honored arguments, while he himself has none. Actually, he has the very best of arguments for his own way of seeing, but they work on the intuitive level of his psyche beyond his conscious access. Therefore, he surrenders to photography's quality assumptions, thinking that he is thereby learning to see.

Most people who have gotten into photography through work in classes and groups have had experiences such as this. When they are heavily leaned on by teachers, classmates, and others in their camera club with respect to print quality concepts, they assume that they themselves are wrong and the most adept learners right. After they have thus conformed they then look back on the years prior to their surrender as a time of relative blindness. I think this explains why so many photographers are so sure that non-photographers don't know how to see. It just wouldn't occur to such people that they themselves had excellent perception all along but lacked the vocabulary with which to verbalize it. And it would take a very insightful person indeed to see that in surrendering to photography's quality concepts he may have narrowed his perception rather than expanded it.

Another thing that makes photographers so certain that others can't see is that the outsider can't tell "good" prints from "bad" ones. They forget that the supposed goodness and badness are mental constructs based on photography's quality traditions, but not necessarily on anything in everyday experience in the visual world. The outsider's inability to choose between them only shows his lack of familiarity with the traditions, not his inability to see. The truth is that he knows very well what pictures he likes to look at but sees no reason whatever in worrying himself about the nit-picking nuances of print quality that photographers are so enchanted by. Indeed, if he were to be told about them we might be astonished by the triviality of many of them.

For the foregoing reasons it is easy enough to see why photographers are prone to assume that they are the only ones capable of showing what reality really looks like. After all, they are the only ones who are even able to see it. What

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they are actually doing, however, is fitting bits of the world into their quality concepts and saying that they are recording them accurately and in the best possible way. Of a given print it would be much better to say, "This is one of the myriad ways that this segment of the world looks like. What something looks like depends on who is looking at it."

There is certainly no harm in showing what things look like—to oneself—but it's not so good to assume they look that way to everyone. It is a way of lessening, or underestimating, the potentialities of the race. On the other hand, if we keep in mind that everyone sees differently we can spend an interesting lifetime trying to figure out how they do see. Eventually, we might even come to the point of letting people make prints in their own natural way, instead of forcing them into the print quality traditions. Then it would be quite easy to learn how they see.

One of the major traditions, still followed by thousands of photographers, is that a photograph has good print quality if it closely resembles a well-done piece of art work in another medium. There was a time, years ago, when photography used this notion nearly to cripple itself—by trying desperately to imitate second-rate painters from around the turn of the century. It was like a fairy queen trying to turn herself into a frog. Well, this emulation is still going on at a great rate, but I no longer see any reason for concern. Many of the people in the other arts are so desperately trying to escape the influence of photography that they've spread themselves out all over the universe, where they hope that photography can't follow.

Since they are so spaced out they can act as a kind of leaven for us when we get too stuffy within the sacred boundaries of some of our more restrictive traditions. This freshening of photography has been going on all along, because some of our most clever photographers have been systematically using the other arts as their gold mine. Though they would be the first to deny it, it is nonetheless true. Their feeling stems from the notorious fact that photography once badly damaged itself through imitation and they don't want to be accused of leading it into the same abyss. Well, it's not happening now and not likely to again, because photography has grown to such magnitude and diversity that it just won't fit into the trap again.

On the other hand, our forays into the other arts have greatly expanded our quality traditions, so that we're coming

ever closer to when photography will escape the bondage of the more restrictive traditions. Then a person will be able to use the medium in any way he likes without being rejected, ridiculed, or forced to conform to quality concepts that are alien to his way of seeing and what he is trying to do with his work.

This brings us to the last quality concept on the list: that a photograph has good print quality if it functions as its maker intends it to. This is the only one of them that is broad enough to discourage photographers from turning themselves into semi-castrates. That is, it would be if anyone paid any attention to it. One hears the idea in every gathering of photographers, and all pay devout lip service to it. However, when the chips are down the pressure is still there. If a photographer shows a print the others dislike, saying that it expresses his intention very well, the steam roller moves into action and flattens him into a gingerbread man.

How people actually interpret this vitally important concept is: "A photograph has good print quality if it functions as its maker intends it to *and we fully agree with his intentions.*" This is not the same thing at all, but it's the way things go. The net effect is that the "deviant" photographer is either rejected by his peers or forced into the conceptual moulds that they themselves occupy.

The truth is that most experienced photographers don't want photography liberated from its bondage, though it will probably happen anyway. One reason is that it might devalue their sacred cow: print quality. If one considers what the cow god means to them it is easy enough to understand their concern. As they see it, print quality in accordance with traditional standards represents:

1. one of the hardest aspects of photography to master;
2. an important expression of the real inner meaning and value of photography;
3. reality truly and accurately seen at its best;
4. the best indication of what things really look like;
5. proof positive that a person has really learned to see;
6. a passport into the community of photographers;
7. an essential element in controlling what photographs will communicate;
8. a ticket into the presence of salon judges, picture buyers, gallery owners, museum curators, etc.;
9. a barrier against people who don't know how to get print quality;
10. the permission of one's peers to

think of oneself as a real artist;

11. proof that one has fully understood and accepted the honored traditions of photography;

12. a way of getting the respect of one's neighbors.

There are undoubtedly other reasons why photographers wish to keep their medium well shackled to its traditions, but these should serve to convince you that we could hardly expect anything else of them. Items 3, 4, and 5 we've already dealt with at some length. The others probably need no explanation. I hope you can see that these are real concerns and certainly nothing to laugh at. If a person believes such things he should obviously be upset at the thought of his quality standards being overthrown.

However, it is not my intention to contribute in even the smallest way to such a thing, for I think it actually would be disastrous for photography. My purpose is to bring some of these unspoken and undefined standards up to the surface where we can get a good look at them. If we can really see the sacred cow for what it is we can become its master instead of the cow being ours. Beyond that I would like to encourage readers to use all of the available quality concepts, instead of just a few, for in that way they are not likely to entrap themselves.

In my opinion photography is in no danger whatever of having its print quality standards undermined, even if we permit people to print any way they like without being pressured to conform. Most people will gladly conform anyway, because the traditions provide them with an excellent means for measuring their performance. Without them they would feel lost. As we will see in a moment these traditions rest firmly on strong and reasonable foundations that would be very difficult to erode.

Furthermore, we must not forget that these quality standards are very actively and vigorously defended. An interesting illustration of this can be found in the work of the members of the Professional Photographers of America, a large group of professionals, most of them portraitists, from all over the country. They have worked so hard in developing their quality concepts, and reached such an agreement concerning what quality is, that nearly all of them photograph and print in exactly the same way.

If you should attend the group exhibit at one of their national conventions you would readily see this strong consensus. At the two exhibits I've seen all the pictures look as though they were shot and

printed by the same person, and he could have done it any time within the last 30 years. All the pictures were loaded to the brim with the kind of quality that sells portraits, wedding portfolios, commercial pictures, etc., to the public. Taken together, the pictures represent a truly monolithic quality structure that works extremely well for the people who evolved it.

Imagine the fate of an "aberrant" or "radical" quality concept in such an organization. Frankly, it wouldn't have the chance of a snowball in Hell. I'm not trying to say that the members are either ignorant or naive, for that would be unfair and untrue. It is that they are strongly aware that their bread is buttered on the side of the quality structure they have so carefully assembled over the years. Naturally, they would defend it with might and main.

Professionals as a whole have this vested interest in the print quality traditions, for their reputations rest upon them to a considerable degree. Teachers of photography are in the same boat. So are salonnists, so-called serious photographers, camera club exemplars, advanced amateurs, people who write about photography, etc. All are heavily committed to defending the print quality traditions.

I feel that our quality traditions are so stoutly defended that we can safely explore a few new concepts without danger of undermining them. It could help us see the older notions from a new angle, which could give them renewed vitality, flexibility, and usefulness, without in any sense eroding them. I will discuss two concepts. One I will call "morbid gray" print quality, which seems to be a relatively new approach to printing. The other is the notion that a photograph has good print quality if it functions as its maker intends it to. This idea has been around for years, but people have never been willing to carry it through. Since both of these concepts are heavily involved with what pictures communicate, I will preface my comments about them with a few words on the relationship of print quality to what pictures say.

Because it is sometimes verbally awkward to make a division between *how* a picture was printed and *how well* (an aspect of print quality), I will combine the two in the following material. The idea of printing is to try to see what is latent in the negative, then to choose the means (exposure, paper grade, etc.) for bringing it out. This is the *how*. Our degree of success in seeing what is latent and in using the chosen means for converting it

into an effective print is the *how well*. Unfortunately, if the two terms are separated it is impossible to say certain things. This is because making a picture is an organic process in which each part is an aspect of all the others. It is perhaps the main reason it is so difficult to talk about print quality coherently: It is a part of (or inherency) of everything else. This is also why I have had to let the meaning of the term "print quality" shift so often, almost from paragraph to paragraph. However, if you read this material a paragraph at a time you should have no trouble with the meaning shifts, for each paragraph embodies its own definition.

Printing and print quality can influence what photographs communicate in the following ways:

1. Communication of emotion (mood) is largely controlled through print contrast and exposure. For example, a dark print with low contrast would suggest negative emotion, whereas a lighter one with brilliant contrast would be more positive.
2. The order in which we will see things in a picture (dominance and subordination) can be considerably influenced through printing, usually by dodging and/or burning-in. This in turn establishes a hierarchy of importances, so that people can distinguish between the primary subject(s) and secondary ones.
3. The entire idea of a picture can be strongly affected by the way and quality of its printing.
4. Printing can control the relative visibility of things in the picture area, which strongly influences what they will communicate.
5. Printing and print quality can introduce a feeling of time and place, which in turn affect what is communicated.
6. They affect how real or unreal a subject appears to be.
7. They may strongly influence how much a subject resembles things other than itself, thus affecting what it will communicate.
8. The style and quality of a print have a bearing on how much it resembles ones made by other photographers, thus how much it can share their meaning.
9. Mainly by obscuring them, printing can make things in a picture tend to function as symbols, rather than as particular things.
10. Print quality can make people or things look clean or dirty, healthy or unhealthy, and even alive or dead.
11. Mainly through contrast variations, printing can control the amount of drama in a picture.
12. Printing can falsify a setting in which



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a subject was found, obliterate it, or create a new one.

13. Printing and print quality can affect the degree to which a picture attracts and holds attention.

14. They can also make quite clear how the photographer felt about his subject matter.

15. They also have a strong effect on whether a given picture is beautiful, pretty, homely, or ugly.

Though there are many others, these are some of the main ways in which printing and print quality help establish the meaning in pictures—both emotional and intellectual. Though some may find them self-evident, I thought it wise at this point to remind you that our print quality concepts have evolved for very substantial and intelligent reasons. The fact that some people approach them as idolators or self-programmed robots doesn't change this truth. Remember, the purpose of this essay is not to destroy traditional ideas but to prod people into using them better. One step in this direction is to see that they have an underlying purpose.

We are now ready to move on to that strange and interesting phenomenon that I have called the morbid gray print. At the very outset I will say that we should make room for it within our sacred canons of quality, even though most photographers dislike it intensely. This attitude in itself is enough to guarantee that they won't permit it to change or undermine our more popular tenets of print quality. Putting up with something you truly dislike can have a very vivifying effect: It makes you think. Furthermore, there are things that can be said in favor of morbid gray print quality. Though you may not agree they may give you some insights into other approaches to quality.

For several years I have been trying to describe the morbid gray print, calling it ugly, abominable, dirty, and paranoid. Though these terms are all accurately descriptive they also embody obvious and biased value judgments, which is not a good thing. It implies that making such a print is not a legitimate and sane objective for a photographer, though this is certainly not true. Indeed, many people have been well rewarded by working for this kind of print quality. And it is a kind of quality, even if the majority of photographers wouldn't accept it as such.

Perhaps the terms "morbid gray" are in themselves sufficient to describe this kind of print, but it is often downright ugly. However, in this context ugliness shouldn't be seen as a put-down term,

because it is one of photography's most useful tools. We are constantly playing it off against beauty, but making sure that beauty comes out on top. This is partly because we are afraid of sheer ugliness in photography, though the other arts have delved into it for years. Thus the photographers who confront ugliness as such are actually following a well-established tradition.

However, there is also a tradition within photography itself, though a fragmentary one. I've seen prints that would fit the definition "morbid gray" by such people as Julia Margaret Cameron, Atget, Stieglitz, Weston, and Strand, though none of them went all out for sheer ugliness. It has been suggested to me that David Vestal works mainly in the restricted morbid gray tonal range, as does that splendid photographer from Pratt Institute, Arthur Freed. Though I see their work as more lyrical than morbid, they skate so close to tonal morbidity that many will disagree with me. The only famous photographer that I know of who makes prints that are flat out ugly is England's Bill Brandt. A typical Brandt picture looks like it has been stomped on for a week, then stored ten years in a damp coal mine.

So there is a kind of tradition for morbid tonalities. What is relatively new in this area is the jump into outright ugliness. Since this must seem like utter perversity, you will surely wish to know why people do it. It is partly that you can say certain things with ugliness that you just cannot say with beauty. And some of them badly need saying. For example, if you are going to photograph a slum to show how ugly it is you should find the courage to end up with really ugly pictures, for the ugliness is what you are really talking about.

Recently, Bruce Davidson has been severely criticized for not doing this in his pictures from East 100th Street, one of New York's worst slums. Nearly every one is radiantly beautiful, but that is because he was talking about the people he found in the slum, not the slum itself. Nevertheless, he might have tried showing both the ugliness of the slum and the beauty of its people in the same pictures. He may have faulted a masterpiece by refusing to see, confront, and use sheer ugliness when the appropriate times arose. In a sense he falsified the life situation in which he found his subjects, thus negating the power his pictures might have had to draw the kind of help that would improve things.

In comparison, Bill Brandt shows no such reluctance in his photographic

commentaries on English life. When he sees something he doesn't like he really runs it through the grinder, showing the ugliness that is already there, then adding a lot more on his own to make sure that people know they are seeing something that he considers ugly. For my tastes he overdoes it a bit, but that's his right as a creative artist. He's certainly in little danger of being misinterpreted.

Another reason for making ugly pictures is to express and explore your negative emotions, usually with the idea of trying to overcome them. The people who are trying to do this are mostly young photographers, many of them studying photography in art schools, colleges, and universities. What they are doing with their pictures makes them stand out, yet they are a definite minority and under strong pressure from teachers and other students to "improve their print quality." However, in terms of what they are trying to do it is already excellent, even if ugly.

Many of the younger generation are consciously using photography in self-therapy—to put their heads together they say. In such an endeavor the negative emotions certainly ought to be carefully looked at, for they are the source of a myriad problems. If it happens that the morbid gray print is a good way for getting them to the surface and down on paper where they can be dealt with, then it should be accepted as a legitimate approach to print quality. It has quality as a therapeutic tool, even if few people like it. We don't like hypodermic needles, dentists' drills, stomach pumps, and scalpels either, but we accept them as useful and necessary.

Strangely, the people who intentionally make ugly gray prints often upset themselves deeply by doing it. This is certainly not what people usually have in mind when they are printing. The reason for the upset is that this type of printing can express negative emotion so strongly and accurately that the self-therapist is powerfully confronted by things from within himself that are very hard to live with. Though he intentionally digs them up in order to wrestle with them, they are still hard to face.

Now, the traditionalist is deeply disturbed by the morbid print whenever he encounters it and does his best to consign it to oblivion. He feels it is an attack against the beloved quality standards on which he bases his claim to be a real photographer, standards that are based on beauty. It is nothing of the sort, because there is no chance whatever that the human race will give up its love affair

with beauty that has flourished through the ages. The ugly print is not an argument that we should love ugliness more than beauty; this is preposterous. It is merely the claim that ugliness, in the world and in oneself, should be examined now and then. We are not even asked to stop disliking ugly prints, just pay a little attention to what they are trying to say.

We will now return to the notion that a photograph has good print quality if it functions as its maker intends it to, which I think should be adopted as the main basis of all our quality standards. In its light the morbid gray prints have quality, because they function as intended. However, our ideas of quality are so strongly shackled to mere prettiness that the intention is not accepted. The result is that photography is limited as a medium of communication, because there are certain kinds of things it is not permitted to discuss. Not all photographers wish to limit it in this way, but the majority apparently do.

If we actually accepted this basic concept, instead of merely paying it lip service, it would mean that everyone involved with photography would be permitted, even encouraged, to make any kind of print he liked, even if it violated the print quality canons. This may sound like an invitation to anarchy, but I don't think it is—for reasons such as the following: The other day a self-tutored woman in my class at the Smithsonian brought in an excellent portfolio of prints. However, she had so little awareness of the print quality standards that she came up with at least a dozen distinctly different kinds of prints, including several of the morbid gray type. With the exception of the latter, they would all fit very neatly within one or another of our canons of acceptable quality, though she was familiar with none of them. The ugly prints were good too, but they are not generally acceptable. When asked how she had happened to come out with so many kinds of print quality she said that she had merely printed each picture the way it seemed to want to be printed, so that was just how they came out.

The point is that if people feel free to print in any way they like they will not violate the quality canons but use them freely, sliding from one to another according to the expressive demands of individual pictures. This is true even if they know nothing whatever about the canons, because the canons themselves are very basic expressions of how people see and what they prefer the world to look like. Thus if photography had to

begin all over again from scratch we would probably come up with the very same quality standards. If entrenched traditionalists were more certain of this they could relax their conformist pressures on others in photography.

The situation with the woman in Washington was by no means unique. In my years as a teacher I've encountered it literally hundreds of times, people intuitively making prints that would meet the most hardnose standards, at the same time unaware that the standards exist. However, the same kind of people also tend to move freely outside the pale of acceptable print quality when their pictorial intentions seem to demand it. There they come under the onslaught of narrow-minded print quality purists. If they succumb to it, which is usually the case, their potentialities as expressive photographers are very severely diminished. I suspect that this one thing has ruined more brilliant photographic talent than any other.

Well, we should stop doing it, and the best time for reform may be right now. What we need is a set of quality standards broad enough in scope to encompass all possible uses of the photographic medium. Though we are not there yet we've been moving in this direction since the beginning of photography. Fortunately, many of our best photographers are powerful innovators in the quality arena, steadily pushing out the boundaries of acceptability so that photography can talk about more and more things in more and more ways. In my mind one of the outstanding examples of this was in Ernst Haas' bullfight pictures in *Life* some years ago. Though they fit hardly a single then-existing quality canon, with one enormous wrench they practically forced the photographers of the world to accept blurred movement as a legitimate expressive technique.

We'll return to my Washington student for a moment, because she can help us see how far the expansion has gone. In terms of subject matter, message, and technique her pictures were all over the map, yet only four out of several dozen fell outside the pale of acceptable kinds of print quality. Even ten or fifteen years ago this wouldn't have been the case, because nearly all of her work would have been tried and found wanting. So we've come a long way, even though we are not ready to see that the rejected four are also excellent prints—in their own abominable way.

I think we should start our reform with the idea that it is legitimate to use pho-

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tography to say anything whatever that it is capable of saying, whether we personally agree with it or not. Then we should work very hard to accept the notion that a picture has good print quality if it functions as intended, even if we dislike the intended function, the print quality, and everything else about the picture. This may be a case of giving the Devil his due, but it is also a matter of leaving other people alone so that they can grow creatively in any of the myriad directions that photography leaves open to them. Furthermore, our dislike of another person's printing may stem from very real differences in the way our perceptual systems work, for we should always remember that no two human beings see quite alike. Thus to say that his print lacks quality may be saying that his vision lacks it too, an attitude that it would be hard to justify. After all, we know practically nothing about how other people see, so it makes no sense for us to stand in judgment upon them.

Though there are similarities in the way we all see, there are also great differences, which should be respected. This should be a central notion in every photography classroom and at every camera club print night. Instead of dwelling incessantly on what other people's pictures *should be* we should concentrate almost entirely on trying to tell them what they *are*, carefully avoiding value judgments and always making it clear that our observations are strictly subjective, or personal. Our objective should not be to change people, but to help them see what they already are. For this approach to be fully successful we must always remember that people see differently and that we should respect those who don't see as we do.

Many teachers today consider it their duty to pressure their students into following a single printing style and the quality standards that go with it, each teacher using his own style as the goal for everyone. This is not a good thing, because style should be a reflection of a person's inner nature, and a single style just won't fit everyone. Indeed, forcing a student into one's own approach to printing is often nothing more than a complete negation of his personal way of seeing.

When students first come to a teacher their portfolios often exhibit dozens of kinds of print quality and printing styles. This is precisely as it should be, for it permits one to use the medium flexibly enough for his pictures to say nearly anything he wants them to. However, he will soon find that his teachers and many

of his fellow students will accuse him of inconsistency and do their best to imprison him in a single style and set of quality standards. When their efforts are successful, as they usually are, they then praise themselves for getting the poor fellow "straightened out." Well, this kind of behavior is actually downright criminal.

It is true that being limited in this manner produces a kind of consistency, but where is the virtue in that? A pianist could do about the same thing by playing only one note. A cook could do it by putting garlic in everything, including his apple pies. The truth is that a person's teachers and fellow students shove him into this kind of a bind for reasons that are hardly respectable. They do it mainly to prove to him that they are right in their opinions about photography and to get him to shove his pictures into a familiar cubbyhole so they can pride themselves on fully understanding them.

Instead of narrowing people down in this manner, thereby negating the breadth, depth, and nature of their vision, we should encourage them to fly as far as they can with their photography. With beginners the teacher should say very little about the accepted standards of quality and help his students develop their personal standards on the basis of what they want to do with their photography. To be successful in this he has to take the stand that every print a student brings him is a good one from one point of view or another; or he wouldn't bother to bring it in.

The next step is to maintain that it also has excellent print quality in its own particular way, even if it has little resemblance to what we generally think of as quality. If a teacher adopts these attitudes and holds steadfastly to them he can work with students without negating their perception. Without traumatizing them with strong value judgments he can examine their pictures and impartially explain to them how each individual one works. His emphasis is entirely on what each photograph *is*, not on what it *should be*. From his point of view it already is what it should be. In the main, that is; he may be able to suggest changes that would fit in well with the student's intentions without altering them in any way. The suggestions should be tentative, such as: "You might like your picture better if you burned this area in a bit—but, on the other hand, you might not." The idea is to leave off the pressure and let the student make his own choices, while at the same time giving him the guidance he needs.

It helps a teacher stick to these rather uncomfortable concepts if he remembers the differences in the way people see. Because people's print quality should follow from the way they see there are potentially as many kinds of quality as there are people. Or we could say that each picture dictates its own quality, so there could be as many kinds of it as there are pictures.

The problem usually comes when a teacher dislikes a student's pictures, because he then finds it very difficult to have any positive thoughts about them and to refrain from tearing into them. Though they may be good in their own way and have excellent qualities in terms of the intentions they embody, he may be unable to accept this. Therefore, it is very important for him to learn to accept the fact that there is no law requiring a photographer to please others with his pictures. Indeed, the assumption that the photographer's main function is to please is one of the main things that is hamstringing photography today. As I said earlier, there are some subjects such as war, poverty, slums, disease, and inhumanity that should hardly lead to pretty and pleasing pictures. Thinking otherwise is burying one's head in the sand like an ostrich.

A student should also be permitted to make disturbing pictures on a commonplace level, if he likes. For example, one of my students at the Maryland Institute, College of Art is now making a series of pictures that could be called an "environmental self-portrait." That is, he is indirectly describing himself by showing how he reacts to his surroundings. The truth is that he reacts in a very distressed and negative way, as his ugly prints clearly show. He is making them this way to use as mirrors to help him sort out his emotions, a very difficult task at his age. Though his teachers and fellow students say they accept what he is trying to do they have nonetheless turned him into a pariah in their efforts to force him to make pretty prints. Of course, this would make his project utterly useless to him, so he should be left alone and encouraged.

The things I am saying about photography schools will also apply directly to camera clubs and any situation in which photographers group together to talk about their work. I think photography critics and writers should also pay heed to them. I have followed this general route for many years in my teaching, thus I know from personal experience that it works.

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- 17—Color brochures and price list feature and describe the Minolta XK and XE-7 electronic 35mm single lens reflex camera system, full line of accessories and Rokkor-X system of interchangeable lenses from fisheye to 1600mm super-telephoto. MINOLTA CORP.
- 18—Information kit features the Minolta SR system of 35mm single lens reflex photography. Includes color brochures and price list featuring Minolta SR-T 102, SR-T 101 and SR-T 100 cameras. Minolta SR accessories and Minolta/Celtic lenses. MINOLTA CORP.
- 19—Data kit covering Minolta 35mm electronic rangefinder cameras. Full color brochure and price list feature the Hi-matic E and Hi-matic F cameras. MINOLTA CORP.
- 20—Full color brochure and price list describing Minolta Pocket Autopak 70 and Pocket Autopak 50 in full detail including X-cube and No. 110 cartridge systems. MINOLTA CORP.
- 21—Miranda System brochure full color illustrations and specifications on Single Lens Reflex Compact 35mm and all available lenses and accessories. AIC PHOTO, INC.
- 22—Mamiya/Sekor DSX 35mm SLR dual-metering cameras. An 8-panel, full-color brochure describing the features of these versatile cameras, distributed by Bell & Howell Company.

MOTION PICTURE CAMERAS

- 23—"Bolex 16mm catalog describes all cameras and accessories in Bolex 16mm line. Technical details on Crystal Sync, Sync Sound and more. PAILLARD INC.
- 24—Color folder on the new Bolex 525 XL movie camera and accessories. PAILLARD, INC.
- 25—Full color folder on all aspects of Bolex 421 16mm projector with optical and magnetic sound. PAILLARD, INC.
- 26—Full color brochure and price list describe

A library of useful information is available to photographers free, thanks to the instructional literature many manufacturers offer. There are, no doubt several booklets described here that will interest you. You can circle as many choices as you wish on the coupon below. Mail directly to 35MM Photography. Your requests for literature will be forwarded to the manufacturers concerned.

- the many professional and versatile features of the Minolta Autopak-8 B12 super 8 movie camera, including its 12-to-1 macrofocusing zoom lens, lap dissolve and fading features. Also described is its system of accessories for remote, high-speed and time-lapse filming. MINOLTA CORP.
- 27—Data kit and price list featuring Minolta XL-400 and LX250 "low light" super 8 movie cameras and system of accessories. MINOLTA CORP.
- 28—Brochure describing the Leica Super 8 movie camera and its system. E. LEITZ, INC.
- 29—Bauer Super 8 line-detailed brochure on extensive line of cameras, projectors and accessories including XL models. AIC PHOTO, INC.
- 30—Bell & Howell super 8 movie cameras. An 8-page brochure describing three low-light and three conventional full-featured cameras. BELL & HOWELL COMPANY.

LENSES

- 31—Honeywell Lumarat 750mm and 1250mm telephoto lenses. Brochure describes compact mirror lenses designed for use with most 35mm SLR cameras. HONEYWELL, INC.
- 32—Fully illustrated brochure Vivitar Series 1 lenses. PONDER & BEST.
- 33—Soligor T4 Auto, Fixed Auto, Preset and zoom lenses fully described in colorful new brochure, including detailed information on close-up accessories. AIC PHOTO, INC.
- 34—New Soligor C/D lenses described in colorful brochure including specifications and performance data. AIC PHOTO, INC.
- 35—Mamiya/Sekor: 14 interchangeable lenses and accessories for use with the DSX 35mm SLR cameras are described in this 8-panel color brochure. BELL & HOWELL COMPANY.

LIGHTING EQUIPMENT

- 36—Honeywell guide to use of electronic flash, with information on Honeywell professional, shoe mount and studio Strobonars. HONEYWELL, INC.
- 37—Minolta Auto Electroflash 450, brochure and price list detailing operation of this high-power, bracket-type flash unit and accessory system. MINOLTA CORP.
- 38—The new Vivitar models 100 & 200 electronic flash are described in this fully illustrated, full color brochure. PONDER & BEST, INC.
- 39—Ultrablitza Bauer brochure listing features and specifications on the E25 Auto Express, E18 Auto and the E16 electronic flash units. AIC PHOTO.

- 40—"SUNPACK automatic/manual electronic flash system fully described in illustrated brochure. Includes comprehensive data on both shoe-mount and handle-mount units including thyristor types. BERKEY MARKETING COMPANIES, INC.

PROJECTORS, SLIDES & SCREENS

- 41—Full color brochure and price list outline the operation of Minolta Autopak AFT/2 auto-focus slide projectors. MINOLTA CORP.
- 42—Four-color brochure on Leitz Pradovit projector describing the Pradovit Color 150 and 250, plus Auto-Focus models. E. LEITZ, INC.
- 43—Screen Selector on a colorful folder presents complete line of Da-Lite Slide and Movie Screens, shows what size screen to choose. DA-LITE SCREEN COMPANY.
- 44—Brochure describing Electrolet Screen, giving information on all sizes. DA-LITE SCREEN COMPANY.
- 45—Bell & Howell Slide Cube™ projectors. A 6-panel brochure describing the features and accessories of the full line of compact projectors that use the unique square Slide Cube™ cartridge that stores slides in about 1/4 the space of bulky round slide trays. BELL & HOWELL CO.
- 46—Bell & Howell movie projectors. A 6-panel brochure describing three full featured, compatible super 8—regular 8 projectors and one super 8 magnetic sound projector. BELL & HOWELL COMPANY.

PICTURE TAKING ACCESSORIES

- 47—A four page catalog listing complete line of incandescent lighting equipment, projector tables, slide files and reel chests for motion picture film. SMITH-VICTOR CORPORATION.
- 48—Full color brochure illustrating the Vivitar Automatic Tele Converters. PONDER & BEST.

- 49—Full color folder on Vivitar Quality Tripods. PONDER & BEST, INC.

DARKROOM EQUIPMENT

- 50—Hasselblad technical booklet on copying techniques. Provides complete information regarding films, filters, lighting and other information. PAILLARD INC.
- 51—Full color brochure and price list describe operation of the Minolta Color Enlarger System. Including filter-drawer module, dichroic filter module, color analyzer and accessory system. MINOLTA CORP.
- 52—A 6-page folder featuring America's finest line of Enlarging Easels for prints with borders, borderless prints, and repeating easels to fit all enlargers. SAUNDERS PHOTO/GRAPHIC INC.
- 53—A 24 page pamphlet on complete line of Bogen Darkroom Equipment Cat. #25M671. BOGEN PHOTO CORP.
- 54—New 36 page brochure on enlargers, darkroom items, tripods, unipods, lighting equipment, copy stand and lights, illuminated slide copier, super imposing movie titler, umbrella lighting. TESTRITE INSTRUMENT COMPANY.
- 55—Premier Equipment Catalog lists over 70 items available off Darkroom use. PHOTO MATERIALS COMPANY.
- 56—Brochure on new Gralab Darkroom Timer. DIMCO-GRAY CO.

EXPOSURE METERS

- 57—"SPECTRA exposure meter system detailed in informative illustrated brochure". Explains concept of incident light metering. BERKEY MARKETING COMPANIES.
- 58—Honeywell Pentax 1°/21° exposure meter booklet covers use of uncannily accurate, versatile spot meter. HONEYWELL INC.

MISCELLANEOUS

- 59—As exciting as photography itself, THE NIKON SCHOOL. You are welcome to attend, no matter what camera you own. Now in its fourth year, over 100,000 students completed this unique weekend short course in 35mm photography. BROCHURE describes curriculum 1974-1975 semester, schedule. Includes handy enrollment form. EHRENREICH PHOTO-OPTICAL INDUSTRIES, INC.
- 60—"From Berkey Marketing"—a comprehensive brochure with data on GOSSEN exposure meters, KONICA rangefinder and SLR cameras, LINHOF large format cameras, MINOX ultra-miniature system, OMEGA enlargers and darkroom aids, RAPID taking and enlarging lenses, TAMRON automatic SLR lenses and ZERO-HALLIBURTON aluminum cases. BERKEY PHOTO MARKETING COMPANIES, INC.
- 61—Hasselblad Landscape Technical Booklet describes various techniques for shooting landscape and scenic pictures. PAILLARD INC.
- 62—Hasselblad Technical Booklet on Wildlife Photography. Techniques and examples of outstanding Wildlife photography with complete details and information. PAILLARD, INC.
- 63—Photo books from Kodak, a color pamphlet describing 49 up to date publications on picture taking and darkroom techniques for both hobbyists and professionals. Includes prices. EASTMAN KODAK CO.
- 64—Sixty-six page, illustrated booklet includes details on entire line of Canon cameras and accessories. Includes 35mm SLRS, 35mm Electric Eye and 126 cameras, 8mm movie cameras, 16mm movie cameras, 8mm movie projectors, plus accessories for movie cameras, Canon and Canon binoculars. CANON U.S.A., INC.
- 65—"Be a Professional Photographer", a fully illustrated free 36 page catalog describes famous "Learn by Doing" photography course offered by The School of Modern Photography. SCHOOL OF MODERN PHOTOGRAPHY.
- 66—Tips on Tripods brochure from Soligor Quick set complete with recommendations on types of tripods and benefits from usage of tripods on all types of tripod equipment. AIC PHOTO INC.
- 67—Brochure on new procedure "O-Fix". Add Orbit Bath to fix. You only fix for 2 minutes instead of 10 minutes with 10-15 minutes wash you will obtain archival results. TKO CHEMICALS.

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doesn't have to be physically ugly in order to distress photographers. It may merely be so unfamiliar to them in its subject matter and treatment that they can find no way of fitting it within their lexicons of acceptability. However, they tend to think of such pictures as ugly until they get used to seeing them, by which time they think of them as being acceptably handsome. I think they actually frighten photographers when they first show up, for they feel themselves under attack from an alien way of looking at things. Nonetheless, the history of photography has clearly shown that they have provided a haven that has kept the art in a state of healthy growth. Bearing this in mind the teacher should be very leery of jumping on a print just because it upsets him. That may even be its intended function.

I have been saying that each person should be encouraged to evolve his own personal quality standards and that they should be a direct outgrowth of what he wishes to use his photography for. Furthermore, he should be encouraged to make any use of it whatever, as long as it is ethical. Surrounded by students who are all following their own stars, the teacher often feels very lost. However, he gets over it in time. Because there is a finite number of things that people will try to do with the medium he eventually learns to recognize them all, or most of them. But while he is still in the lost stage he should see that it is better for him to be out in left field than to ram his students into the comfortably familiar categories that he can recognize and think about coherently.

The idea of personalized quality standards for everyone would make some photographers uptight and others furious, for they see it as an invitation to chaos and an attack against the very foundations of photography. They ask, "If everyone does his work in an entirely different way how can there be any communication among us? What value will our experience have in a world in which every Tom, Dick, or Harry uses the medium in any way he pleases?"

In practice there turns out to be no reason for concern. Once a photographer has developed his personalized quality standard as a way of validating his personal vision he then becomes fascinated by the traditional standards and gobbles them up avidly. Since he has not been pressured to conform to this kind of printing or that, he moves freely through the whole tradition, using each concept as it suits his purposes.

The truth is that we must use other people's vision in order to expand our own. This is an inescapable fact of life. Photography's quality traditions are a very gold mine for this purpose, for they are a living encyclopedia of how thousands of people have been seeing the world for more than one hundred years. In this light the idea that a person would limit himself to his personal vision while rejecting everything else begins to look a little preposterous. It would be like a toad refusing to turn into a prince.

A final argument in favor of the individualized approach is that it can shorten greatly the time it takes a person to learn to print well. By this I mean printing his own way and according to the traditions, too. Once his teachers and fellow students have helped him validate his personal vision (by merely accepting it as it is expressed in his prints) he masters the traditional quality concepts at very high speed. This usually takes two or three months, but I have had a few students who did it in a week. It used to take much longer. In my early years of teaching at the Rochester Institute of Technology it often took us as long as two years to teach many of our students to print, and they were a carefully selected group. Our ideas were strongly conformist then.

I think I have given you some good arguments in favor of this approach to teaching and other group activities in photography. It would do much to vitalize photography and make it more meaningful to people. However, do not suppose that it will be generally put into practice in the next year or two, because there are many reactionaries in photography who will do their very best to see that it doesn't. They are bound to fail in the long run, nonetheless, because photography has been firmly headed in this direction for many years.

The purpose of this essay has been to persuade you to take a close look at how you are affected by ideas concerning print quality, or the print quality traditions. In my opinion we have turned print quality into a sacred cow and permitted it to dominate us without question. However, we can safely remove it from its throne and regard it only as one of our necessary tools. This will not harm or diminish our quality traditions, but expand and vivify them. Finally, I presented you with an approach to teaching quality concepts that is both fair and broad enough for everyone involved in photography. Whether you vote for it or not I think it will eventually prevail.

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STAN MALINOWSKI

Lady in the Lake—A test shooting for Playboy, at Malinowski's "poor man's Jamaica" near Michigan City, Indiana. With a Nikon F2 and 500mm f8 Reflex Nikkor lens, with a 50 Magenta filter. Exposure was 1/15th sec., on Kodachrome II with camera on tripod. Slight underexposure to achieve a semi-silhouette and keep sky dark.

Stan Malinowski, Chicago pro, has what many of us would call a dream photographic specialty: women. He has frequent assignments for top glamour magazines and has 10 Playboy covers to his credit. During his career he's also shot underwater, food, fashion, aerial and "just about everything there is to do." Stan is typical of today's young professionals: almost without exception they start with Nikon, and never, ever use anything else. He started with a Nikon SP rangefinder. It was a little different with the older pros, of course. Most of them discovered Nikon after starting with other brands. But, young or old, the story is the same now. The vast majority of today's and tomorrow's great photographers use Nikon. You can join the fraternity, at your Nikon dealer. Or write for Folio 10A, Nikon Inc., Garden City, N.Y. 11530  Subsidiary of Ehrenreich Photo-Optical Industries, Inc. (In Canada: Anglphoto Ltd., P.Q.)

